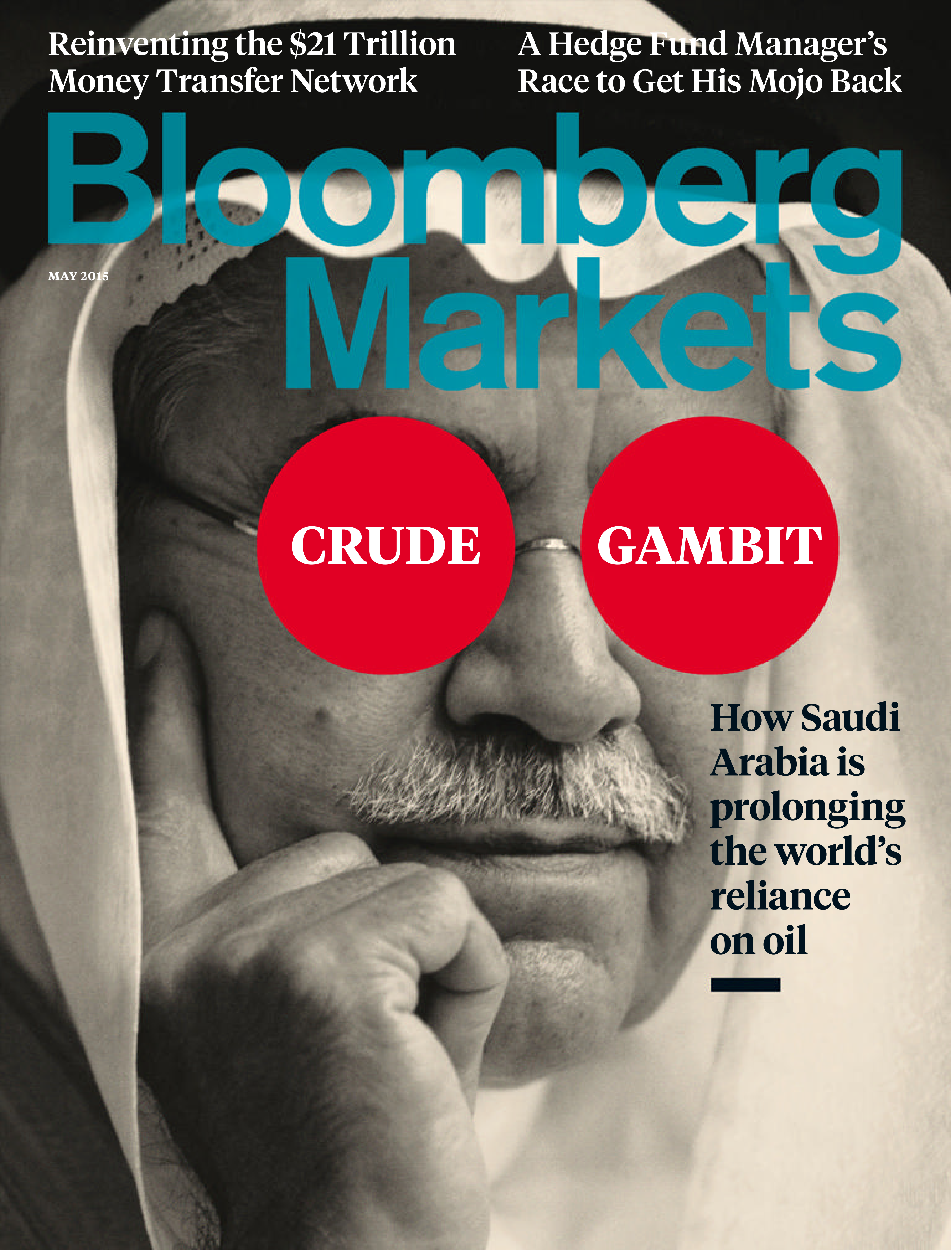
Reinventing the $21 Trillion Money Transfer Network

A Hedge Fund Manager's Race to Get His Mojo Back

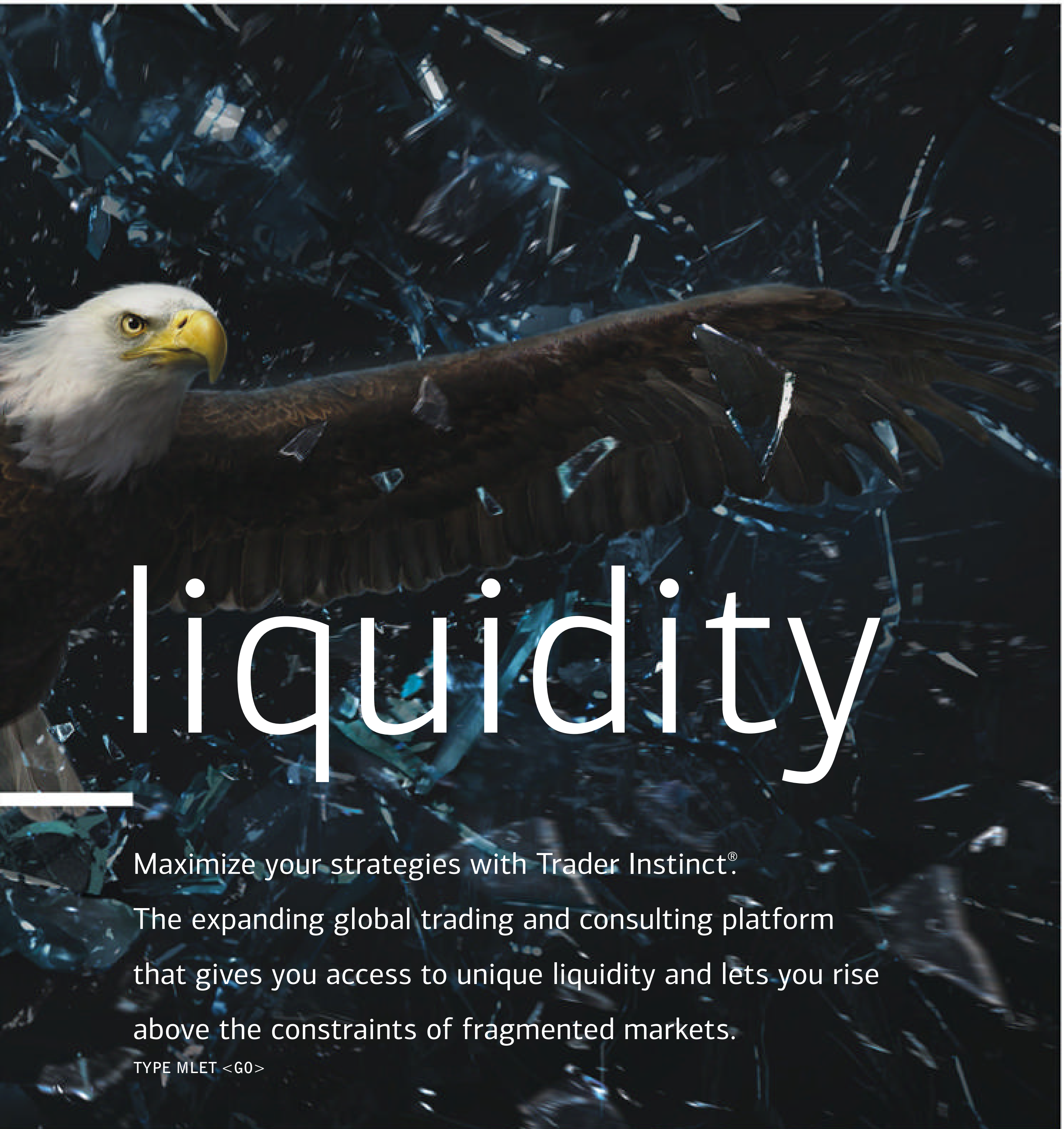
Bloomberg Markets

MAY 2015



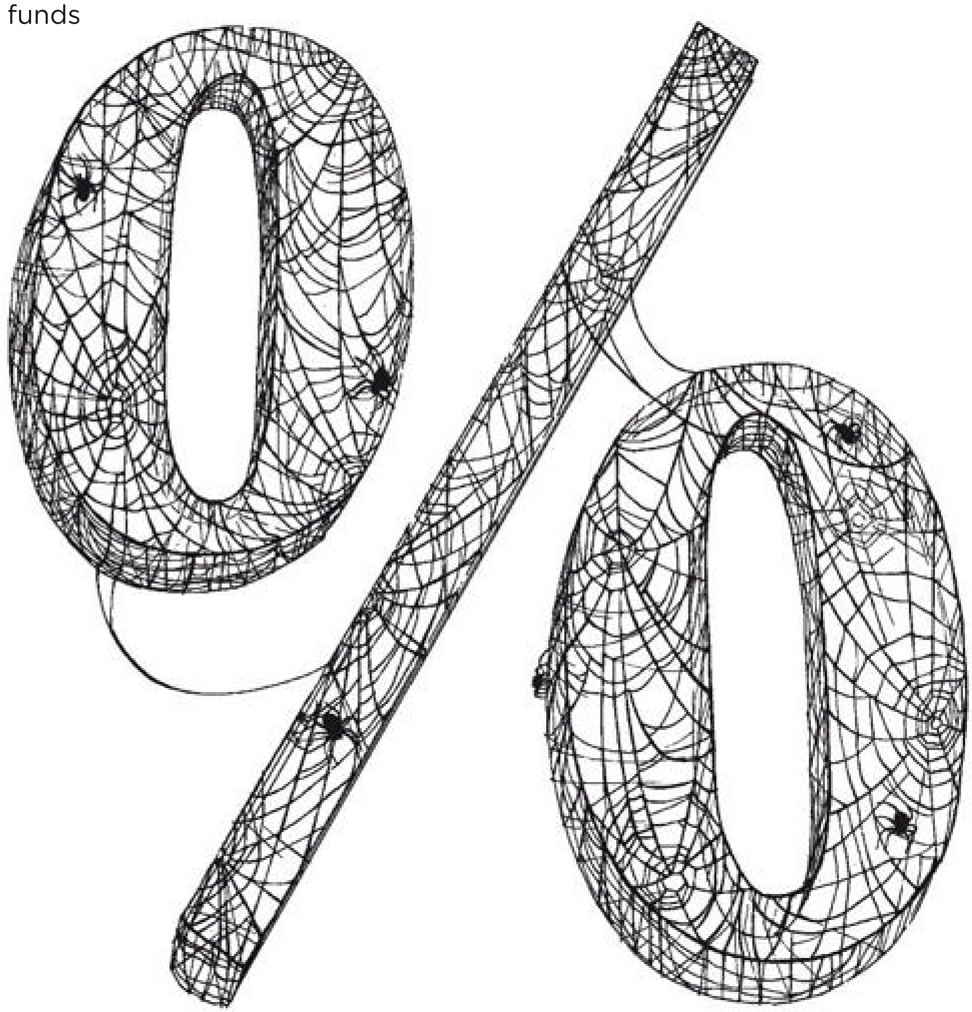
CRUDE GAMBIT

How Saudi Arabia is prolonging the world's reliance on oil



Bank of America Merrill Lynch

The power of global connections™



Financial Sector SPDR ETF

Top Ten Holdings*

XLF - FINANCIAL

	Company Name	Symbol	Weight
1	Berkshire Hathaway B	BRK.b	8.99%
2	Wells Fargo	WFC	8.65%
3	JP Morgan Chase	JPM	7.66%
4	Bank of America	BAC	5.56%
5	Citigroup	C	5.31%
6	US Bancorp	USB	2.67%
7	American Intl Group	AIG	2.59%
8	Goldman Sachs	GS	2.57%
9	American Express	AXP	2.43%
10	Simon Property	SPG	1.98%

** Components and weightings as of 2/28/15.*
Please see website for daily updates. Holdings subject to change.

stocks. Investors cannot invest directly in an index. The S&P 500 Index figures do not reflect any fees, expenses or taxes. Ordinary brokerage commissions apply. ETFs are considered transparent because their portfolio holdings are disclosed daily. Liquidity is characterized by a high level of trading activity.

Select Sector SPDRs are subject to risks similar to those of stocks, including those regarding short-selling and margin account maintenance. All ETFs are subject to risk, including possible loss of principal. Funds focusing on a single sector generally experience greater volatility. Diversification does not eliminate the risk of experiencing investment losses.

ALPS Portfolio Solutions Distributor, Inc., a registered broker-dealer, is distributor for the Select Sector SPDR Trust.

STATE STREET GLOBAL ADVISORS

TYPE STSP <GO>

May

volume 24 / number 05

‘We want to make sure it’s as easy to go solar as it is to get DirecTV. No capital investment, no upfront money, nothing.’ *Lyndon Rive* *page 36*

FEATURES


36

PHOTOGRAPH BY **RAMONA ROSALES**

May

FEATURES (CONTINUED)

COMMENTARY

AGENDA

STRATEGIES

ON THE COVERS


Saudi Petroleum Minister Ali al-Naimi, far left
Photograph by Haraz N. Ghanbari/AP

Jimmy Lai
Photographed at home by R.D.

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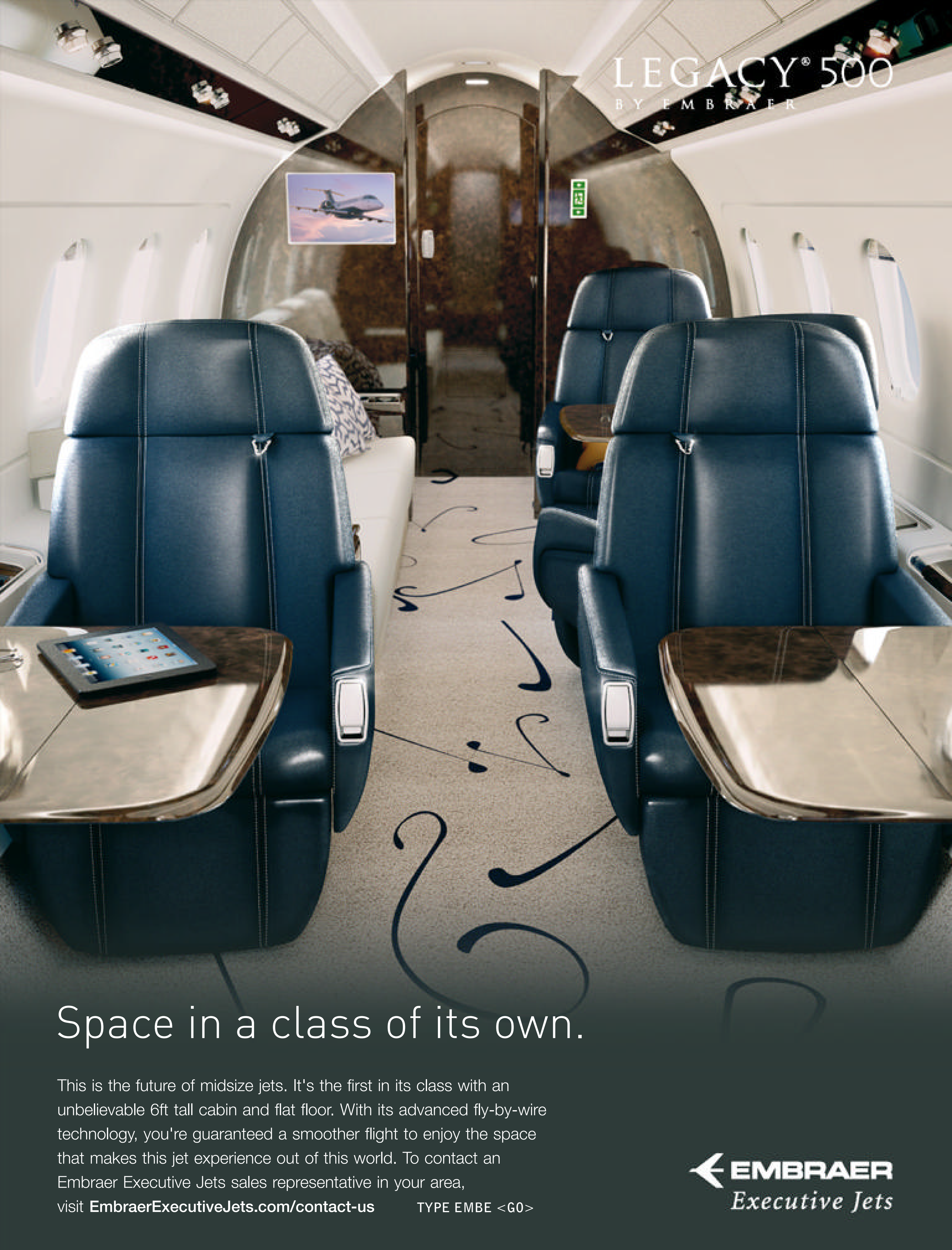
PHOTOGRAPH BY **MILLER MOBLEY**


LEGACY® 500
BY EMBRAER
Space in a class of its own.
This is the future of midsize jets. It's the first in its class with an unbelievable 6ft tall cabin and flat floor. With its advanced fly-by-wire technology, you're guaranteed a smoother flight to enjoy the space that makes this jet experience out of this world. To contact an Embraer Executive Jets sales representative in your area,
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Editor's View

The Saudis' Middle Game

GIVEN THE SPRAWLING importance of oil and the large number of people who track its every move—traders, executives, cabinet ministers, and armies of analysts and consultants—you'd think the world would do a better job of forecasting supply and demand. Remember "peak oil"? That was the theory, popular just a few years ago, that the world's ever-increasing appetite for crude—notably in China—would surpass the ability to produce it. How wrong that turned out to be.

What worries the world's top oil exporter isn't peak supply; it's peak demand.

Instead of supply shortages, we now have a global glut. Much of what's happening has to do with a dramatic rise in production in the U.S. and with the actions—or, more to the point, inactions—of Saudi Arabia, the world's largest exporter of crude. Despite the global plunge in prices, the Saudis have kept the spigot wide open. Underpinning this strategy, reports Peter Waldman in the opening story of our Energy Outlook package, is an effort by the desert kingdom to spur global consumption. The Saudis are concerned that climate change measures, efficiency, and fuel switching will cause demand to go into permanent decline (**"BUYING TIME: THE SAUDI PLAN TO EXTEND THE AGE OF OIL,"** page 26). What worries the Saudis, in a nutshell, isn't peak supply; it's peak demand.

One energy source eating into demand for hydrocarbons is solar. John Lippert and Christopher Martin report on battles being waged by brothers Lyndon and Peter Rive to make solar distribution more efficient (**"SOLAR EVANGELISTS,"** page 36). Martin looks separately at the long-standing quest to make batteries that are more powerful, more efficient, and cheaper (**"BUILDING A BETTER BATTERY (FINALLY),"** page 42). While progress is being made on alternatives such as solar, the end of the oil age isn't coming anytime soon. And that's a forecast you can count on—maybe.

Ron Henkoff

EXECUTIVE EDITOR

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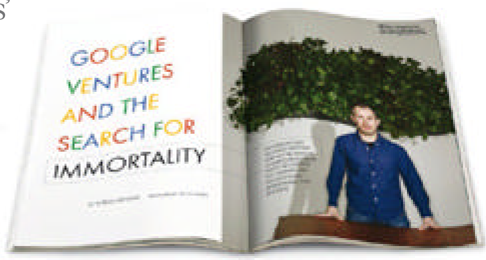
Letters

"Google Ventures and the Search for Immortality"

APRIL 2015

Finding a solution to aging is important. Most of us will be stricken with chronic diseases that hamper our community involvement and consume three-quarters of developed economies' health budgets. That doesn't include the burden on families. In writing this article, you have potentially connected people that can make a difference. Therefore you have made a difference.



MARK ROWSON
LifeGene Project
Melbourne

"Will Tesla Ever Make Money?"

APRIL 2015

Now that the hoopla has mostly subsided about the wonders of the Tesla automobile, the company is likely to discover that its business model (sales and finance in particular) presents risks no other automaker is willing to assume. The next year will determine whether Tesla can work out its financial commitments and raise enough capital to fund its new models and battery plant.

MARYANN KELLER
Maryann Keller & Associates
Stamford, Connecticut

Your story on Tesla was comprehensive and insightful. I often stall partway through such things, but yours took me through to conclusion. Great job!

ROGER ATKINS
Consultant
ElectricVehiclesOutlook
London

I believe Tesla will be out of business or sold to a real car company by 2020. With BMW and others entering the space, I doubt Tesla will ever hit its sales targets. Elon Musk will grow tired of the car business and turn to playing with rockets.

MARK SULLIVAN
Retired strategic planner
General Motors
Rochester Hills, Michigan

CORRECTIONS

In "Staying Active" (April 2015), the correct name of the management company running the Delaware Small Cap Core Fund is Delaware Management, and the correct name for the firm running the Vanguard Strategic Small-Cap Equity Fund is Vanguard Group. The co-managers of the Vanguard Long-Term Investment Grade Fund are Vanguard Group and Wellington Management. In "Is There a Next Jack Bogle? Not If You Ask Jack Bogle" (April 2015), Jeremy Siegel's correct title is senior investment strategy adviser at WisdomTree Investments.

INFORMATION FOR READERS

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AGENDA

A World of Easy Money

Central bankers outside the U.S. are rushing to cut rates and weaken their currencies, but risks to their economies are mounting as the Fed goes the opposite way.

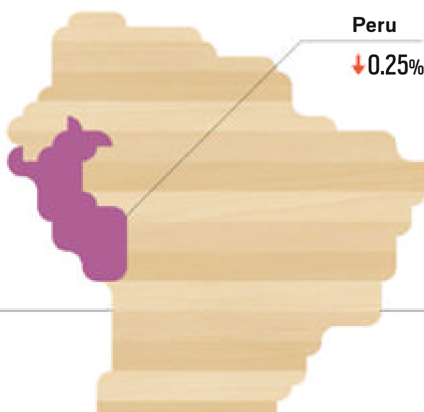
AS THE WORLD celebrated the start of 2015, the Uzbekistan Central Bank got to work on its New Year's resolution to provide more support for the economy, and it cut interest rates by one point to 9 percent. Monetary authorities around the globe have shown similar resolve in the months since.

By mid-March, policy makers in more than two dozen countries, including China, Canada, Russia, and Australia, had cut. The European Central Bank, out of room to reduce its benchmark rate, moved forward with a €1.1 trillion ($1.2 trillion) bond-buying plan.

All told, countries representing half the world economy have easier monetary policy now than they did at the end of last year. That's quite a statement, given that the global recession ended half a decade ago.

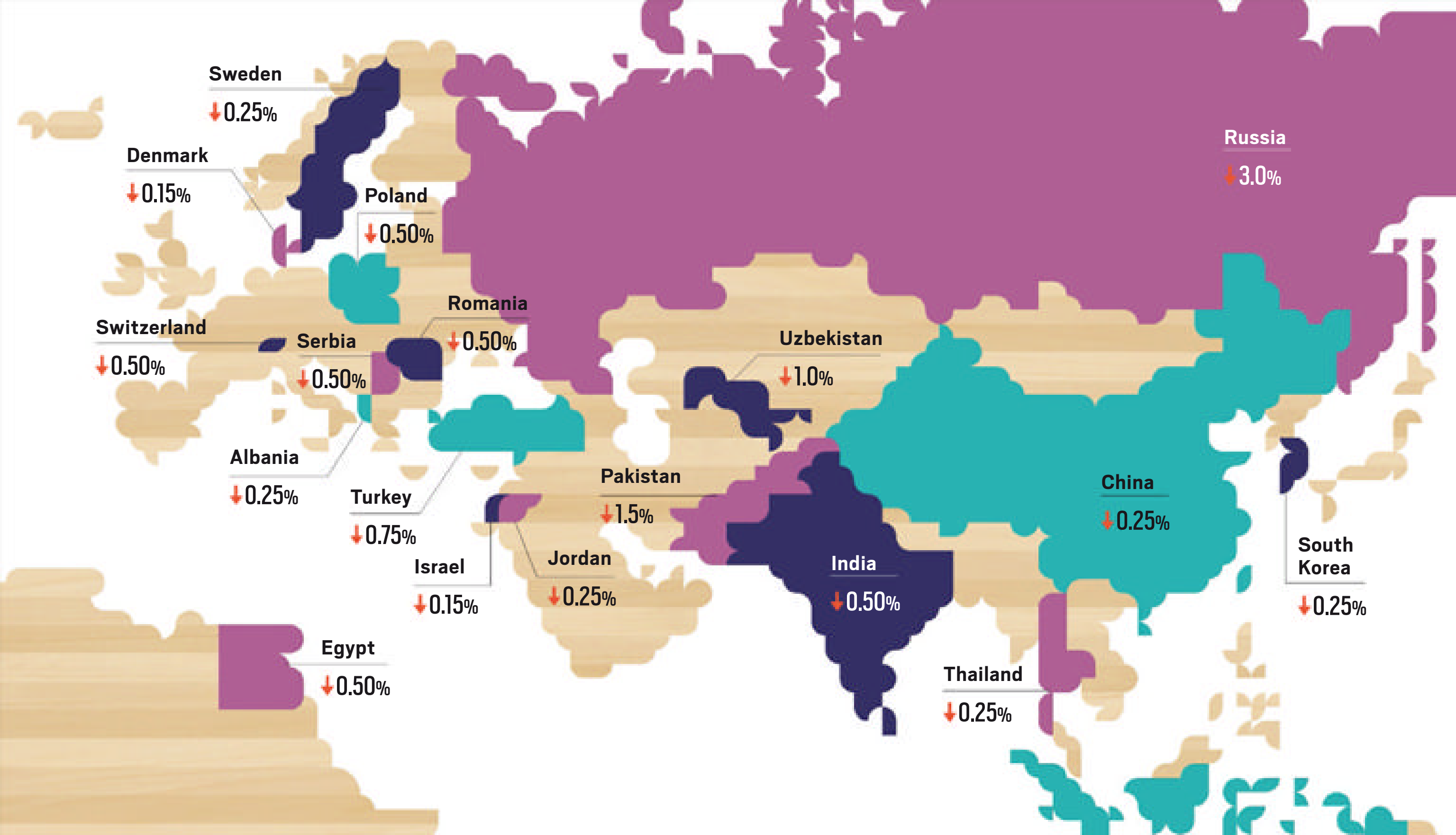
"Policy makers are responding to an unambiguously very weak global inflation outlook," says Gustavo Reis, a global economist at Bank of America Merrill Lynch.

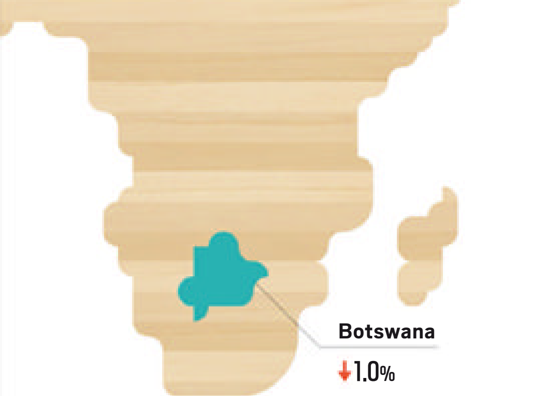
Of 18 countries where the central banks have a formal inflation target, 16 had inflation running below the desired level at the start of this year, according to the Bank of England. Indeed, U.K. inflation dropped to zero in February from 0.3 percent in January, while the BOE aims for 2 percent price growth. The widespread slowing of inflation, driven by sliding commodities prices, has been enough to fan fears of deflation in Europe and Japan. "That's why easy policy is the right answer," Reis says. "The global easing we've seen should help to stunt the downward movement in inflation."



There's also a competitive, beggar-thy-neighbor aspect to all this easing. Central banks don't want to be caught out with higher rates—and

As of March 23.





thus stronger currencies—as other countries act. Officials in India and Australia were among those to fret that climbing currencies threatened their economies by making exports pricier.

The conventional wisdom through the early part of this year was that the U.S. Federal Reserve would be able to withstand the global trend and raise interest rates from near zero, perhaps as soon as June. That view took a hit when the Fed met on March 18. Even as Chair Janet Yellen and colleagues on the Federal Open Market Committee removed their pledge to be "patient" before lifting the rate benchmark, they signaled the U.S. economy wasn't as immune to events abroad as they once thought.

Their new reason for concern was the surging dollar, which resulted from the easier monetary policies elsewhere. Against the euro, for example, the dollar had reached its highest rate in a dozen years just days before the Fed met.

"The bottom line is that the size of the dollar move has now reached a magnitude where it is clearly feeding into Fed policy," says Jens Nordvig, managing director of currency research at Nomura Holdings in New York.

Most Wall Street economists still believe the Fed will raise rates this year, according to forecasts compiled by Bloomberg, but they're now predicting that liftoff is more likely to come in September than in June.

Even with a delay, financial markets could wobble when the Fed acts. The dollar's importance to other economies means a tighter U.S. monetary policy will counter the effect of easy money elsewhere. Higher interest rates will be enough to draw investors into U.S. stocks and bonds and away from riskier trades.

The Bank for International Settlements has been sounding the alarm, warning that nonbank borrowers outside of the U.S. owe $9 trillion in dollar-denominated debt, up 50 percent since the financial crisis in 2008.

Two years on from the "taper tantrum," when non-U.S. assets suddenly lost value at the first sign that the Fed was ready to withdraw its extraordinary monetary support, emerging-markets currencies and stocks are again feeling the pinch. Capital Economics, a macroeconomic research firm based in London, identifies Brazil, Turkey, and South Africa, whose economies have large debts or current-account deficits, as particularly vulnerable to higher U.S. interest rates and a strong dollar.

"The stimulus elsewhere has a dampening influence, but there is little doubt the U.S. continues to set the global interest rate," says economist Manoj Pradhan at Morgan Stanley. "There are economies, in particular the emerging markets, which will have a difficult time."

The rest of the new year may not be that happy. **SIMON KENNEDY**

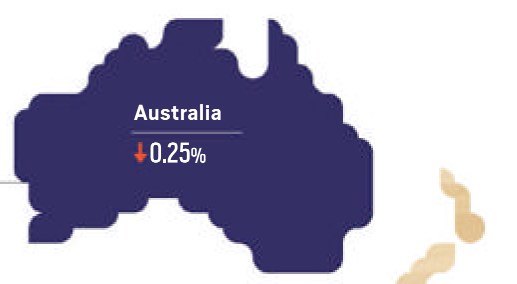


ILLUSTRATION BY **TY WILKINS**

MONEY PITS

ONE-YEAR DECLINES VERSUS THE DOLLAR

RUSSIAN RUBLE	NORWEGIAN KRONE	SWEDISH KRONA
▼ 40.8%	▼ 29.2%	▼ 28.2%

Can *Game of Thrones* Save Croatia?

Recession has been a dagger for the Balkan nation, but a blockbuster HBO show filmed there has helped keep tourism dollars flowing.

MORE THAN TWO decades after Serbian-Montenegrin forces shelled Dubrovnik's medieval ramparts, the sounds of battle are once again rumbling within its storied walls. Only this time, they're welcome.

The red-roofed city on Croatia's southern coast is drawing new visitors as a filming site of HBO's *Game of Thrones*. The hit show, based on George R.R. Martin's fantasy series *A Song of Ice and Fire*, has gained legions of fans for its intricate story, power-obsessed characters, and gratuitous nudity. The fifth season, which was also shot in Spain and Northern Ireland, was set to premiere on April 12 in more than 170 countries.

Dubrovnik, already Croatia's top tourist destination, plays the part of King's Landing, a city teeming with the Machiavellian Lannisters. The production has provided thousands of jobs to extras, support crew, and businesses riding the surge in tourism. "I hope that *Game of Thrones* will do for Dubrovnik what the *Lord of the Rings* films did for New Zealand," says Andro Vlahusic, the city's mayor.

That would be a boon for both Croatia and its investors. The country of 4.2 million, which was the 11th-most-promising frontier market in *Bloomberg Markets*' annual ranking, joined the European Union in 2013 hoping to boost a living standard that's 61 percent of the bloc's average. But with the economy having plunged 12 percent in a recession that has lasted since 2009—the EU's third-biggest contraction, after Greece and Cyprus—it's needed all the help it can get. Buoyed by a bond rally across the Continent, the country's five-year debt is still yielding 3 percent, the EU's third-highest level, again behind Cyprus and Greece.

Daenerys Targaryen is one of the most popular characters in *Game of Thrones*, scenes of which are shot in **Dubrovnik**.

MACALL B. POLAY/HBO; ELVIS BARUKCIC/AFP/GETTY IMAGES

Tourism is crucial to Croatia's economy, making up about a sixth of output, and the country boasts the third-highest number of foreign visitors per capita in the EU. Foreign tourism arrivals rose 6 percent in 2014 to about 13 million. In Dubrovnik, along with other *Game of Thrones* filming sites such as Split and Sibenik, where Roman-era ruins dot the Dalmatian coast, the series is making a difference. "Dubrovnik's tourism in recent years is growing at 10 percent a year, and I think *Game of Thrones* is responsible for about half that growth," Vlahusic says. While he says the show is adding $10 million a year to Dubrovnik's tourism revenue, it's the buzz that the show is creating that Vlahusic and his countrymen hope can help raise the nation's international appeal. Indeed, while the show's producers have only spent $14 million shooting in Croatia,

BRAZILIAN REAL	EURO	DANISH KRONE	CZECH KORUNA	COLOMBIAN PESO	POLISH ZLOTY	HUNGARIAN FORINT	AUSTRALIAN DOLLAR	JAPANESE YEN
▼ 27.7%	▼ 23.9%	▼ 23.9%	▼ 23.7%	▼ 23.4%	▼ 22.8%	▼ 22.3%	▼ 16.5%	▼ 16.3%

As of March 18. Source: Bloomberg

Dubrovnik has already attracted other film projects, not to mention a planned *Game of Thrones* theme park.

With the Croatian currency, the kuna, having weakened 10 percent against the dollar this year through March 20, foreign tourists can snap up bargains. Three-hour tours take visitors through the sets of King's Landing in Old Town Dubrovnik,

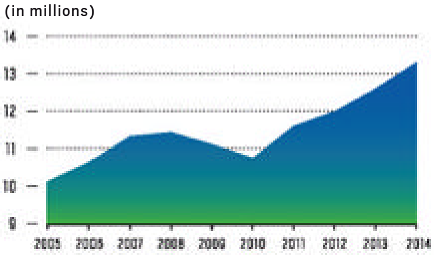
'I hope that *Game of Thrones* will do for Dubrovnik what the *Lord of the Rings* films did for New Zealand.'

including a walk on the walls overlooking the site of the Battle of the Blackwater. Enterprising tourists also stroll to the abandoned Hotel Belvedere, where a graphic fight scene between the Mountain and the Red Viper of Dorne was filmed.

For Croatians such as Gina Pecotic, an extra who's played a peasant as well as a noblewoman, the show has been both a fun ride and a reason to hope the country can emerge from its recession. "When they asked me to come for a costume rehearsal, I quit my job and told myself, 'Girl, now it's your time to have fun,'" Pecotic says. "This series has energized Dubrovnik, and it's great fun and a privilege to be part of it."

JASMINA KUZMANOVIC AND MICHAEL WINFREY

CROATIA TOURISM ARRIVALS
(in millions)



THE WALL STREET–MINDED PROFESSOR

JOHNS HOPKINS UNIVERSITY'S STEVE HANKE SAYS HE PLACES 100 PERCENT OF HIS STUDENTS IN FINANCE JOBS.

PEOPLE ASPIRING TO work on Wall Street often try to get into "target schools"—top colleges for investment bank recruiters. Johns Hopkins University isn't a target school. It doesn't even offer an undergraduate degree in finance. But the Baltimore mecca for medicine has what could be called a target course: Applied Economics and Finance, taught by professor Steve Hanke.

His prodigies have gone on to work at such institutions as Goldman Sachs, JPMorgan Chase, Morgan Stanley, and hedge fund firm Third Point. In fact, Hanke—who selects just 12 students every semester—says he places 100 percent of each class in finance jobs.

"I look for his name when I'm going through résumés," says Brian Dietze, a senior investment banker at Stifel, Nicolaus & Co. in Baltimore. "His students come in better prepared than their counterparts."

In particular, Hanke's disciples know how to evaluate companies and tell investors whether they should buy or sell their stocks. Each student assesses one company every two weeks, starting with raw figures from regulatory filings. From there, they build a discounted cash flow model according to a proprietary system Hanke helped develop.

"Most of the people going through our course are better than MBAs," says Hanke, 72, an Iowa native who joined Johns Hopkins's faculty in 1969. (Michael Bloomberg, the founder and majority owner of Bloomberg News parent Bloomberg LP and an alumnus of the university, has donated more than $1 billion to Johns Hopkins.) Through the years, Hanke has also advised President Ronald Reagan, consulted for hedge funds, and, most famously, designed currency-stabilizing systems for countries with money woes, such as Argentina and Bulgaria.

"I wouldn't consider Professor Hanke's class a course," says Seth Weisberg, a junior who's studying applied math and economics. "It's more like a job." Weisberg will learn how true that is this summer, when he begins a 10-week gig at Jefferies Group—making him one more of Hanke's protégés storming Wall Street.

ANTHONY EFFINGER

ILLUSTRATION BY **JASON LEE**

SLIPPING GIANT?

Half of the 14 Chinese dot-coms that debuted on a U.S. exchange last year are trading below their IPO prices.

As of March 20.

A Spider in the Deep Web

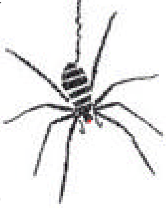
To help financial companies thwart hackers, a U.K. firm is taking the offensive.

ON A RECENT MORNING in London, a dozen young technicians are watching their pet "spider" at work.

They're employees of Digital Shadows, a four-year-old cyberthreat intelligence outfit that's pioneering a new way to defend banks and investment firms from hackers. Rather than build taller and thicker firewalls, Digital Shadows goes on the offensive by hunting for potential problems.

Encircling enterprises with digital force fields to protect against invasion is an outdated strategy, as the intrusions at JPMorgan Chase, Sony, and Target have demonstrated, according to James Chappell, Digital Shadows' co-founder and chief technology officer. IT systems have simply become too open and diffuse to keep the bad guys out.

"Social media, long supply chains, mobile technology. There is now so much that no longer lives within the castle walls; it lives beyond them," he says. "You can no longer assume that you'll never be hacked. You have to assume that you will be."



Enter the spider, a program of the firm's own design. Crawling through shadowy corners such as the Deep Web and the Tor network, the program searches 80 million data sources in 26 languages for signs that Digital Shadows' clients are at risk.

One example: an official-looking Twitter account supposedly belonging to a bank that, after six months, suddenly begins offering customers assistance. Digital Shadows neutralized that threat last year and says its spider can also unearth individuals selling account numbers and even hacktivists plotting to deface a bank's website.

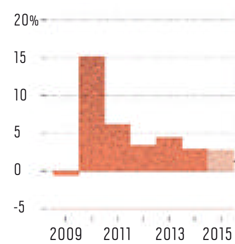
Top financial institutions have taken notice of Digital Shadows' approach. Last June, the Bank of England even tapped the company to pose as so-called black-hat hackers and infiltrate British banks as part of a test. The firm has since opened a New York office catering to Wall Street. "We should not expect to build an impermeable perimeter that, through technology design, will withstand attack," Andrew Gracie, an executive director at the BOE, said in a January speech. "Rather, we should expect the cyberthreat to be ever present, ever evolving, and networks to be penetrated."

EDWARD ROBINSON

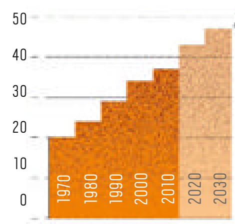
LIFE AFTER LEE

SINGAPORE'S BUMPY ECONOMY MAY TEST ITS FOUNDER'S LEGACY.

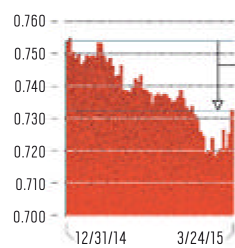
SINGAPORE NOT ONLY ranks as the world's most expensive city; it's also home to the most millionaires per capita. But the recent death of its founder, former Prime Minister Lee Kuan Yew, and a deteriorating economic outlook have many of its citizens feeling vulnerable. "As much as Lee Kuan Yew deserves credit for Singapore's success, he also should be seen to be part of today's shortcomings," says Bridget Welsh, a senior research associate at National Taiwan University. Three causes for concern in Singapore: its stagnant GDP, aging population, and slumping currency. **YOOLIM LEE**



2.8% The GDP growth forecast for 2015, which economists in a March central bank survey cut from 3.1 percent



47 The forecast median age of Singaporeans in 2030, which would make them among the region's oldest



3% Amount the Singapore dollar has fallen versus the U.S. dollar this year, Asia's third-worst performer

Source: Bloomberg

ILLUSTRATION BY **5W731**

One of Gordon Getty's Napa wines, the **2012 Odette Reserve Cabernet Sauvignon**, got a perfect score from Robert Parker. Says Getty:
"It's the first screw-cap wine to get 100 points. I had it the other day, and it's amazing."

COURTESY OF ODETTE ESTATE

TIPS FROM A BILLIONAIRE

Gordon Getty

The J. Paul Getty heir always goes big—whether it's economic ideas, his classical music, or a 'perfect' Napa cabernet.

BLOOMBERG BILLIONAIRES INDEX NET WORTH **$3.5 BILLION**

AGE: **81**

INDUSTRIES: **FINANCE, WINE**

ETFs, MUTUAL FUNDS, FINE ART

HEDGE FUNDS, BANKS, GOLD

You've been composing since 1980. Are you a businessman or artist?
Business I have to do, but it's fun, too. Even if I agreed with some of the socialists that the free market is iniquitous, I would still be for it because it's so much fun.

You have a buy-side company.
ReFlow, which provides liquidity to mutual funds seeing redemptions. It hasn't conquered the world like I hoped 10 years ago. But it's been cash flow positive for the past five years. It's alive and kicking.

What's your approach to investing?
I've always been a risk taker. There's a logic to that: If you are born to wealth, you can afford to lose a fair bit and still be fine.

If you had to invest new money right now, would you choose funds, gold, bonds, or stocks?
If I had to choose one thing, I'd say SPDRs.

You spend a lot of time on economics.
Money and banking theory. The banking system to me has failed. There have been once-a-generation failures since its founding in Venice in 1200. We keep blaming the incidents that spark them, like subprime, but not blaming the big leverage that's the root of the problem.

Is wine a vanity business?
I don't want to lose money in it. You lose morale, and nobody takes you seriously. The more you make, the more confident the people working for you are.

Malcolm Forbes crowned you America's wealthiest person in 1983. Do you miss being the richest?
Hell no.

Today, Bloomberg has you at $3.5 billion.
Honest to God, it hasn't been on my mind in so long. I have much more dough than I need. It's always fun to make more, but it's just a game!

EXCERPTED FROM AN INTERVIEW BY BRENDAN COFFEY, CONDUCTED MARCH 17 AT GETTY'S HOME IN SAN FRANCISCO.

PHOTOGRAPH BY **DREW KELLY**


BEHOLD:
THE 540-MPH DESK.
Work is fast. But you can move faster. Delta First Class lets you outpace your next meeting in midair with more Wi-Fi than any other carrier, expanded workspace, and more. So you arrive on time and ahead of the game. No wonder more people choose Delta than any other airline.
KEEP CLIMBING
DELTA
Features differ according to flight type/destination/aircraft. Terms and conditions apply.
To review full terms and conditions, please visit delta.com/firstclass
TYPE DLTA <GO>

'You want to make your businesspeople more like artists, and you want to make your artists more like businesspeople.'

—Kickstarter's **John Dimatos** on the intersection of creativity and commerce

Crowdfunding Wine

Through Naked Wines and other platforms, vintners are raising money to branch out on their own or expand an existing business. Yao Ming wants $3 million.

SUPERSTAR WINEMAKER Jean Philippe Moulin developed prestige champagnes for brands like Barons de Rothschild and LVMH's Ruinart but always dreamed of creating a line of bubbly under his own name. Last year, U.K.-based Naked Wines made that possible, providing €500,000 in advance funding through its 250,000 wine-loving customer-investors, who were able to buy Moulin's four champagnes at a discount.

When South African Rowan Gormley founded online retailer Naked Wines at the end of 2008, wine crowdfunding didn't exist. Yet the company's reward-based structure has been so successful that by 2012, it had expanded into Australia and the U.S. "In 2015," Gormley says, "Naked plans to invest £70 million in 145 vintners in 13 countries."

Naked Wines' investors, called angels, commit to a monthly fee of £20 (or $40 in the U.S. and A$40 in Australia) against future purchases of wine offered at lower prices. The pool of money is funneled to talented winemakers like Moulin who need capital to start up their own brand or expand. Most of Naked Wines' 600-odd offerings are exclusives for angels. The U.K. has the widest selection; so far, choices in the U.S. and Australia are mostly limited to wines made in those countries.

In all three locations, there are waiting lists to become an investor. As added benefits, angels get to chat with winemakers and post their own reviews for all to see.

"Recently, the average spend per bottle has gone up," says Gormley. "We have more adventurous wine enthusiasts who will pay for higher quality." That's translated into more name-brand vintners, like Moulin and another recent signer-on, New Zealander Rod Easthope, the former winemaker at Craggy Range who makes brilliant sauvignon blanc.

But Naked's is only one model. In the past year, even large and well-established wineries have turned to equity crowdfunding platforms to get cash for renovation and other projects, gaining social media traction in the process.

In September, England's largest wine estate, Chapel Down, raised almost £4 million ($6 million) to acquire more vineyards and build a winery through website Seedrs. Burgundy's Domaine Chanzy went the same route to line up more than £1 million. And basketball star Yao Ming took to Crowdfunder to offer fans shares in his Napa Valley–based Yao Family Wines for $5,000 and up. Those who invest the most—he's looking for $3 million in total—will be entitled to perks such as a VIP winemaker dinner and an invitation to the grand opening of the winery's tasting room in Shanghai.

ELIN McCOY

The world's first commercial rooftop vineyard will have a view of Manhattan. Rooftop Reds' Devin Shomaker plans to establish more than 200 vines of all five Bordeaux varietals at the Brooklyn Navy Yard in May, and he expects the winery's first vintage to be the 2016. A campaign last year on Kickstarter provided the initial $16,820 in funding.

IMAGE SOURCE: FOTOLIA

ILLUSTRATION BY **DAMIEN VIGNAUX**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Seeing Solar Power Clearly

It's fine for power companies to charge solar customers for using the grid, but those charges should reflect real costs.

IN RESIDENTIAL solar power, advocates see a technology that reduces carbon emissions and saves people money. Opponents see a business that benefits only those homeowners with high credit scores and the right kind of rooftops.

Both sides are right. Yet it's possible to ensure that solar power use keeps growing with minimal economic side effects. It just means assessing the increasing cost of solar power to the shared electrical grid.

Rooftop solar panels have become ever more popular as their price has fallen, as John Lippert and Christopher Martin report in "Solar Evangelists," page 38. For each of the past three years, sales have increased at least 50 percent. In the sunny states of Arizona and California, home solar energy users now make up about 4 percent of the population.

PATRICK T. FALLON/BLOOMBERG

That's not to say the panels are cheap. They cost about $20,000 on average to buy and install—down from $35,000 in 2011, but still an upfront investment that most homeowners aren't willing to make. So SolarCity and other companies make the panels more affordable by financing and installing them for homeowners.

SolarCity then leases the panels to businesses or homeowners and sells them power under a long-term contract. Homeowners can use the power to offset their electricity needs and even sell unused electricity back to the utility.

The trouble with this game is that it doesn't account for use of the grid. As power companies are happy to remind you, the grid isn't free. Only about two-thirds of the average electricity bill is a charge for the power a customer uses. The rest reflects the cost of building and maintaining the wires and substations that deliver that power.

While solar customers buy less power, they also pay less toward utility costs—even though they still use the grid like everyone else. Even during daylight hours when they're not drawing power from it, they're sending their surplus power back to it. Because they pay less, some of the expense of maintaining the grid is shifted onto customers without solar panels—typically, people with less money. So the revolution in residential solar becomes a regressive tax on energy.

The goal should be to prevent solar freeloading while encouraging the use of solar power. Several states have oversteered. In Florida, for example, only utilities are allowed to sell power to retail consumers, which bars the leasing arrangements SolarCity uses to make its system affordable.

Other states simply charge solar households for selling power back to the grid. Arizona Public Service sought a $50 monthly surcharge; public pressure brought it down to $4.90. Hawaiian Electric Co. wants to triple its minimum monthly bill to $55, plus another $16 for solar customers. The real cost is probably significantly less, depending on the state.

Monthly fees on solar customers can be a fair solution, as long as they reflect the true grid costs. Users can pay their fair share to make the rooftop-to-grid system run smoothly—and still save money using solar power.

BY THE EDITORS OF BLOOMBERG VIEW
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ENERGY OUTLOOK | BY PETER WALDMAN | ILLUSTRATION BY ALEX NABAUM

BUYING TIME: THE SAUDI PLAN TO EXTEND THE AGE OF OIL

THE BIGGEST EXPORTER HAS LET PRICES PLUMMET—DELAYING THE DAY WHEN CLIMATE CONCERNS, EFFICIENCY, AND FUEL SWITCHING BREAK THE WORLD'S DEPENDENCE ON CRUDE.

Last fall, as oil prices crashed, Ali al-Naimi, Saudi Arabia's petroleum minister and the world's de facto energy czar, went mum. He still popped up, as is his habit, at industry conferences on three continents. Yet from mid-September to the middle of November, while benchmark crude prices plunged 21 percent to a four-year low, Naimi didn't utter a word in public.

For 20 years, the world's $2 trillion oil market has parsed Naimi's every syllable for signs of where supply and prices are heading. Twice during previous routs—amid the Asian financial crisis in 1998 and again when the global economy melted down 10 years later—Naimi reversed oil's free fall by orchestrating production cutbacks among members of OPEC. This time, he went to ground.

At the cartel's semiannual meeting on Nov. 27 in Vienna, Naimi shot down proposed output reductions supported by a majority of the 12 members in favor of a more daring strategy: keep pumping and wait for lower prices to force high-cost suppliers out of the market. Oil prices fell a further 10 percent by the end of the next day and kept going. Having averaged $110 a barrel from 2011 through the middle of 2014, Brent crude, the global benchmark, dipped below $50 in January.

"What they did was historic," Daniel Yergin, the pre-eminent historian of the oil industry, told Bloomberg in February. "They said: 'We resign. We quit. We're no longer going to be the manager of the market. Let the market manage the market.' That's when you got this sort of shocked reaction that took prices down to those levels we saw."

Naimi, 79, dominated the debate at the November meeting, according to officials briefed on the closed-door proceedings. He told his OPEC counterparts they should maintain output to protect market share from rising supplies of U.S. shale oil, which costs more to get out of the ground and thus becomes less viable as prices fall. In December, he said much the same thing in a press interview, arguing that it was "crooked logic" for low-cost producers such as Saudi Arabia to pump less to balance the market.

Supply was only half the calculus, though. While the new Saudi stance was being trumpeted as a war on shale, Naimi's not-so-invisible hand pushing prices lower also addressed an even deeper Saudi fear: flagging long-term demand.

Naimi and other Saudi leaders have worried for years that climate change and high crude prices will boost energy efficiency, encourage renewables, and accelerate a switch to alternative fuels such as natural gas, especially in the emerging markets that they count on for growth. They see how demand for the commodity that's created the kingdom's enormous wealth—and is still abundant beneath the desert sands—may be nearing its peak. This isn't something the petroleum minister discusses in depth in public, given global concern about carbon emissions and efforts to reduce reliance on fossil fuels. But Naimi acknowledges the trend. "Demand will peak way ahead of supply," he told reporters in Qatar three years ago. If growth in oil consumption flattens out too soon, the transition could be wrenching for Saudi Arabia, which gets almost half its gross domestic product from oil exports.

U.S. State Department cables released by WikiLeaks show that the Saudis' interest in prolonging the world's dependence on oil dates back at least a decade. In conversations with colleagues and U.S. diplomats, Naimi responded to the American fixation on "security of supply" with the Saudi need for "security of demand," according to a 2006 embassy dispatch. "Saudi officials are very concerned that a climate change treaty would significantly reduce their income," James Smith, the U.S. ambassador to Riyadh, wrote in a 2010 memo to U.S. Energy Secretary Steven Chu. "Effectively, peak oil arguments have been replaced by peak demand."

The Saudis, to be sure, never thought much of peak oil. That's the theory that global crude supplies, on an upward trajectory for a century and a half, were about

At OPEC's November meeting in Vienna, **Ali al-Naimi** refused to sign on to a proposed reduction in output meant to boost prices as the cartel has done in the past.

SAMUEL KUBANI/AFP/GETTY IMAGES

to stop rising and could no longer keep up with demand. A faction of geologists and environmentalists made this argument part of the policy debate in the early years of this century. In 2005, when a book by oil analyst Matthew Simmons predicted a drop-off in Saudi output would signal that global supplies were beginning an irreversible decline, Naimi belittled the claims and promised higher production capacity. He won the argument. The Saudis pump more today than a decade ago. Saudi oil fields boast state-of-the-art technology, and at least two of them, in the middle of the desert, have gourmet restaurants. U.S. output has had a stunning rise as well, to more than 9 million barrels a day at the end of 2014 from less than 6 million five years ago. The peak that has the Saudis more worried is peak demand.

Before oil prices tanked last year, Saudi officials were bracing for global demand to level off as soon as 2025, says Mohammed al-Sabban, a senior economic adviser to the Saudi petroleum minister from 1988 to 2013. By letting prices fall, they may have bought themselves some time. At $60 to $70 a barrel, peak demand gets pushed back at least five more years, according to Bank of America Merrill Lynch commodities researchers. Such a delay would be bad news for renewable energy companies and for anyone hoping to bend the demand curve lower—slowing or stopping the relentless rise of global oil consumption that has transformed the planet since the first commercial deposit was developed in Pennsylvania in the early 1860s.

Crude prices above $100 a barrel had been bringing a demand peak closer. "The past four years were a disaster for oil producers in terms of energy market share," says Sabban, who was also Saudi Arabia's chief international climate negotiator. "Emerging economies are getting more efficient and diversifying their energy sources. That has definitely impacted oil consumption."

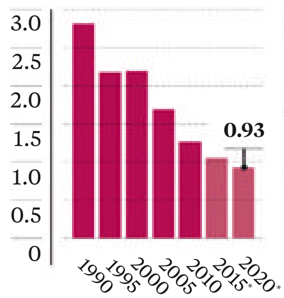
Saudi officials were in a state of "near panic" last summer, when they recognized how quickly demand growth in China was leveling off, in part because of persistently high crude prices, says Ed Morse, Citigroup's head of commodities

Demand Destruction

The global economy is getting more efficient, with less oil burned per unit of GDP, and growth in Chinese consumption is slowing. These trends were strengthened by several years of $100-plus crude prices.

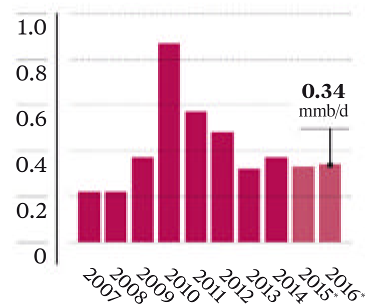
Global Oil Intensity

Millions of barrels per day/ trillions of dollars of GDP



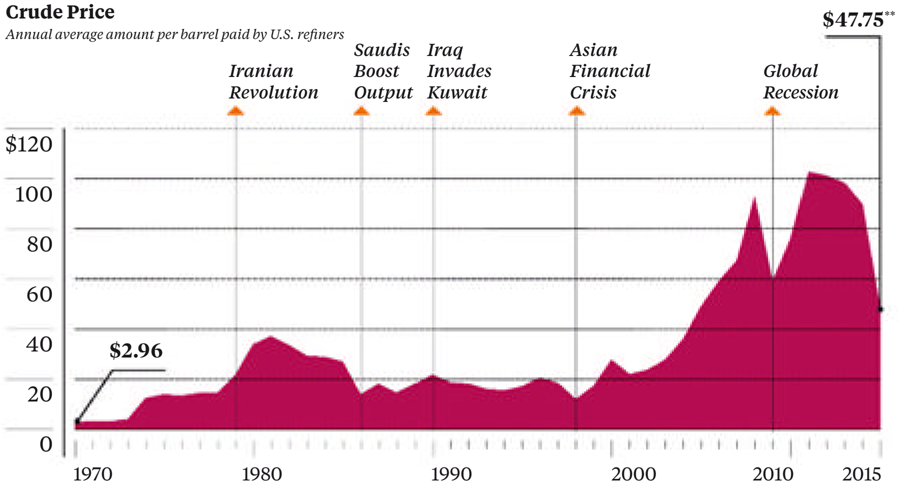
China Demand Growth

Year-over-year increase



Crude Price

Annual average amount per barrel paid by U.S. refiners



*Forecast. **January 2015 only. Sources: IMF, BP, EIA

research. "Naimi saw the era of frantic fixed-asset investments in China was over," says Morse, a former deputy assistant secretary of state for international energy policy, who still communicates regularly with Gulf Arab officials. "That translates to the end of rapid urbanization, the end of doing things in unbelievably energy-intensive ways."

Substitution of lower-cost fuels is also taking a toll. Chinese diesel demand, after rising an average of 8 percent a year for a decade, actually fell in 2013 and 2014. The International Energy Agency attributes this partly to the country's rapidly expanding fleet of natural gas vehicles. Chinese demand for oil this year is expected to rise to 10.6 million barrels a day, an increase of 2.6 percent, or half the average annual growth of the past decade and one-sixth the rate in 2004. China's oil use is still climbing twice as fast as global consumption, but the IEA has in the past year shaved 500,000 barrels from its 2019 China demand forecast. More efficient autos and factories reduced the overall oil intensity of China's economy—oil burned per unit of GDP—by 18 percent from 2008 to 2014. "If I were in Naimi's shoes, I'd do exactly what he's doing," Morse says.

Naimi, who for the past five years has been telling friends he's ready to retire, faces big risks as he sees through one more dramatic market realignment. His refusal to put Saudi Arabia and OPEC once again in the swing producer role, cutting supply to balance the market, hurts economically troubled member states that most need a price rebound. In Venezuela, where the economy is teetering

and foreign-exchange reserves are depleted, oil's collapse blows a bigger hole in the government budget and deepens the crisis. Iran, which needs high prices to help offset the effect of sanctions that have choked off its exports, has had harsh words for the Saudi-led policy. Persian Gulf producers should try to halt the decline in prices, a deputy foreign minister said on state-run television in January, and Foreign Minister Mohammad Javad Zarif delayed a meeting with his Saudi counterpart due to the discord.

Regional tensions were highlighted in late March, when Saudi Arabia led airstrikes against Yemen's Shiite Houthi rebels, seeking to counter Iranian influence there. Oil markets jumped, reacting to Yemen's location near oil trade routes.

Even Saudi Arabia, with more than $700 billion in reserves, could suffer financial strain if oil prices stay low for several years. The kingdom, with a population of about 30 million, spends lavishly on domestic programs and foreign aid. When King Salman ascended to the throne in January, after the death of King Abdullah, he promised in his first speech to improve education and expand health care. The Saudi budget was in deficit in 2014, despite strong oil prices for most of the year. The government forecasts a 2015 budget gap of 145 billion riyals ($39 billion), and it will be wider if oil prices don't rebound.

'OUR ULTIMATE AIM IS TO DIVERSIFY AWAY FROM OUR OVERRELIANCE ON OIL REVENUES,' NAIMI SAID IN 2013. **'IT WILL NOT HAPPEN OVERNIGHT. BUT IT IS HAPPENING.'**

Still, Naimi has said several times since the November meeting that he doesn't know how low prices might go or when they will recover—and that the Saudis are willing to wait and see. Naimi's concerns for Saudi Arabia are further in the future.

"Our ultimate aim is to diversify away from our overreliance on oil revenues," the petroleum minister said at a 2013 seminar in Washington. The centerpiece of that effort is the establishment of the King Abdullah University of Science and Technology on the Red Sea, north of Jeddah. Naimi, who was CEO of state oil producer Saudi Aramco before becoming petroleum minister, recounted how, at a council of ministers meeting in 2006, the monarch took his hand and asked if he could build a university. "I said: 'Your Majesty, we have built—I mean, Saudi Aramco has built—a lot of refineries, gas plants, pipelines, some housing. But universities? No. But we can, if you want.' And we did."

The school's mission, as Naimi articulates it, is nothing less than to lead Saudi Arabia into the post-hydrocarbon age. The campus, built for 220 professors and 2,000 graduate students, is a bastion of tolerance and religious liberty in a country often criticized for having neither. Heavily armed guards on land and at sea protect the facility, where unveiled women study and work side by side with men, undisturbed by the religious police who patrol Saudi cities. Research there is aimed at scientific and commercial breakthroughs using those things Saudi Arabia has in abundance, such as sun, sand, and saltwater. When he discusses retirement, Naimi says it's to devote more time to the institution.

While the university is key to Saudi Arabia's diversification effort, there are other initiatives for the nearer term. The kingdom already is exploiting its huge deposits of phosphates to export fertilizer and is mining bauxite to smelt and roll aluminum. Eventually, Naimi says, Saudi Arabia wants to manufacture finished goods such as car parts. "We are generating job opportunities for our young people, encouraging enterprise, and providing the right environment for innovation and progress," Naimi said at the Washington seminar. "It's not easy, and it will not happen overnight. But it is happening."

How much time Saudi Arabia has to prepare for the eventual decline of the oil era may depend, in part, on how alternatives fare during this period of cheap oil. Will sales of wind turbines and solar panels stay strong? Or will they enter a tailspin like they did during the Great Recession, when project financing dried up? And will

RUSSIA, where Vladimir Putin confidant Igor Sechin, left, is chairman of state-controlled oil company Rosneft, saw the ruble decline almost in unison with the price of crude.

SASHA MORDOVETS/GETTY IMAGES

sales of electric vehicles continue to climb even as gasoline prices slump?

Adam Sieminski, head of the U.S. Energy Information Administration, said at a Washington forum in late January that lower crude prices wouldn't slow development of wind and solar power because there's little direct competition with oil in electricity generation. Electric vehicles, he said, are helped by tax incentives and government policies and perhaps also by the cachet of green technology.

"The Saudis may be once again trying to prolong the age of oil," says Bill McKibben, the author and environmental activist who has helped lead the campaign to block the Keystone XL pipeline, which would bring oil from Canada's tar sands to the U.S. market. "But it feels like the steady, relentless fall in costs for renewables may make this different from other cycles."

Naimi, who carefully manages his public comments the way a central banker or top diplomat might, hasn't said how close he thinks the world may be to a peak in oil demand. He didn't respond to requests to be interviewed for this story. But he has articulated his view that the crude market can no longer be understood without considering the effects alternative energy sources are having. "One has to be realistic," Naimi told the *Middle East Economic Survey* in an interview published in December. "There are many things in the energy market—not the oil market—that will determine prices in the future. A lot of effort is being exerted worldwide, whether in research or boosting efficiency or using nonfossil fuels."

Ali bin Ibrahim al-Naimi has lived the post–World War II history of oil—and done much to shape it. Born in 1935 in Saudi Arabia's oil-rich Eastern Province, he spent his early childhood as a desert nomad, moving from spring to spring with his extended family and their livestock. When Naimi was 8, his Bedouin mother sent him to live with his father in the provincial capital of Dammam. He attended a school operated by Arabian American Oil Co., known as Aramco. The petroleum producer was founded by Standard Oil of California in the 1930s and became Saudi Aramco after its nationalization in the 1970s.

At 12, Naimi became a mail boy at Aramco, taking over for his brother after his sudden death, and he quickly shined as a star typist. One day at the Aramco offices, the American CEO stopped Naimi in the hallway and asked the teenager what he wanted to do with his life, says Peter van de Kamp, who became friends with Naimi at Lehigh University, recounting a story Naimi

KAVEH KAZEMI/GETTY IMAGES

IRAN has been exporting less because of international sanctions, making the decline in the price of crude an even worse blow to its economy.

‘THE SAUDIS MAY BE TRYING TO PROLONG THE AGE OF OIL,’ McKIBBEN SAYS. **‘THE FALL IN COSTS FOR RENEWABLES MAY MAKE THIS DIFFERENT FROM OTHER CYCLES.’**

told their classmates in the early 1960s. “Well, sir, someday I would like to have your job,” Naimi answered. “If that’s the case,” the American said, “you’ll need an education.”

Aramco sent Naimi to school in Beirut and then to Lehigh in Pennsylvania and Stanford University in California, where he earned a master’s degree in geology. At Lehigh, the chair of the geology department assigned the 6-foot-5-inch Van de Kamp to watch out for Naimi, who’s around 5 feet tall. The transfer student from a Mideast country few students had heard of was a good companion, Van de Kamp says, respectful of Christians and Jews, comfortable socializing with women. He was eager to chop firewood and “get his hands dirty” doing chores at the Van de Kamps’ New Jersey home on holidays, he says. Proud of his Bedouin roots, Naimi told stories about tending sheep and goats in a forbidding desert with scarce food or water. He did his senior research project in 1962 on the commercial mining potential of New Jersey’s beach sand. “Ali was a comer; we all could see it,” says Van de Kamp, who’s now a geologist in Oregon.

After returning to Saudi Arabia, Naimi zoomed through a series of oil production and executive positions at Aramco, culminating in his 1984 appointment as the company’s first Saudi president and, four years later, its CEO. At the time, U.S. and European consumption was in decline, due in part to sluggish economic growth and conservation measures adopted after the oil shocks of the 1970s. In response, Petroleum Minister Ahmed Zaki Yamani slashed Saudi oil output from 10 million barrels a day in 1981 to just 3.5 million in 1986. Prices kept falling, briefly getting to around $10 a barrel, as non-OPEC producers and cartel members cheating on their quotas filled the gap. In 1986, King Fahd fired Yamani, and the Saudis flooded the world with cheap oil to seize back market share—and induce Americans to resume their gas-guzzling habits. (The era of big SUVs was just beginning.)

Aramco’s new president saw firsthand what happened when the Saudis cut output and others didn’t, a lesson he cites today. “We will not make the same mistake again,” he said in Berlin in March.

Promoted to petroleum minister in 1995, Naimi spends weekdays working in Riyadh and weekends at his family’s villa or at a small farm near Dharan. He arrives early each day at the ministry, a set of nine-story stone and black-glass blocks. His seventh-floor offices aren’t grand, the decor little changed in 20 years. He leaves in a black Mercedes by 2 p.m., Saudi government quitting time, and works the rest of the day at home.

Naimi’s tenure got off to a rough start. With demand rising in China, he persuaded OPEC to expand production in November 1997, just as the Asian financial crisis was deepening. During the next two years, oil prices fell 50 percent.

He also mishandled Saudi Arabia’s overture to Western energy companies to help develop the kingdom’s natural gas reserves. By 1998, then–Crown Prince Abdullah was trying to lure back foreign firms to tap Saudi gas for industrial projects such as electricity generation, water desalinization, and petrochemical manufacturing. Naimi, however, kept the best gas fields for Aramco while offering Exxon Mobil and dozens of other companies blocks that some Saudi geologists doubted contained much commercial gas, according to Sadad al-Husseini, who led Aramco’s exploration and production operations from 1985 to 2003.

The Exxon Mobil negotiations blew up in 2003, at the home of Saudi Foreign Minister

Saud al-Faisal in Beverly Hills, California, according to journalist Steve Coll's book *Private Empire: ExxonMobil and American Power,* published in 2012. Exxon Mobil's then-CEO Lee Raymond informed Faisal and Naimi that the Saudi field on offer didn't have enough gas to warrant his investment, Coll wrote. Naimi responded that Exxon Mobil's experts were playing down the block's potential to get a better deal. At that point, Raymond exploded at Naimi for questioning his people's integrity, and the deal soon fell apart, Coll wrote. "I was very unhappy," Raymond says in an interview. "The reality was that there was never access to the potential reserves you would need to support the project."

Over time, Naimi earned a reputation as a straight talker and a shrewd manager of the global market. Despite the Saudis' dire warnings to President George W. Bush not to invade Iraq in 2003, Naimi kept markets stable by promising to pump more oil during the war. In 2008, as prices soared to a record $147 a barrel, he resisted intense U.S. pressure to raise output again. Judging shrewdly that market conditions were very different than they were five years earlier, he argued in several contentious meetings with American officials that supply was adequate and that financial speculators were driving up prices. "The line was clear and consistent, even if it wasn't a message the American administration wanted to hear," says Ford Fraker, the U.S. ambassador to Riyadh from 2007 to 2009 and president of the Middle East Policy Council.

During the Libyan uprising in May 2011, U.S. officials flew into Saudi Arabia to seek Naimi's help replacing lost Libyan production. Naimi asked OPEC to expand its output ceiling at the cartel's meeting that June, but the ministers stormed out of the Vienna secretariat without an agreement. The rebel members, led by Iran, didn't want to agree to a higher target because they had little excess capacity that could be brought on line. They objected that the only countries with spare oil to sell were the cartel's richest—Saudi Arabia, Qatar, Kuwait, and the United Arab Emirates.

Afterward, Naimi summoned the press to vent. He'd never seen such unreasonable obstinacy, said the minister, seated in a plush chair in his hotel suite. He'd tried to persuade the others that demand for OPEC's crude had long since surpassed the recession levels that prevailed when the target was last set in 2008. They wouldn't listen.

After some dogged diplomacy, OPEC raised the quota at its next meeting. Oil prices spiked early in the Arab Spring, and then they declined through the rest of 2011.

"He's a man of few words but none wasted," says Daniel Poneman, the U.S. deputy secretary of energy from 2009 to 2014. "He really came through."

Naimi was a study in inscrutability when the OPEC ministers gathered this past November in Vienna. That morning, he slipped out the back door of his hotel on the city's Ringstrasse, trailed by a gaggle of reporters through the medieval backstreets. This brisk morning walk had become known as a moment when Naimi would share his thoughts, but he wasn't talking. A little later, back at OPEC headquarters, impatient with a television crew's badgering questions, Naimi lost his legendary cool. "Get the hell out," he snapped.

Inside the closed-door session, the OPEC ministers sat in alphabetical order around a large rectangular table. Naimi, silver-haired and dressed in a dark suit, blue-purple tie, and matching breast-pocket handkerchief, was seated between Gulf Arab allies Qatar and the U.A.E. Across the table, Venezuela's Rafael Ramirez opened the proceedings with a proposal for a production cut to be jointly implemented by OPEC, Russia, and Mexico, according to the officials briefed on the proceedings.

Naimi scoffed. He told the ministers that after 60 years in the industry, he knew from experience that Russia wasn't reliable. In 2008, the Russians pledged to join OPEC's

BLOOMBERG TIPS | Tracking OPEC Supply

You can use the OPEC Production and Prices (OPEC) function to track output by Saudi Arabia and other members of the cartel. Type **OPEC <Go>** on the Bloomberg Professional service. For data from the Energy Intelligence Group, click on the circle to the left of the New York–based company's name. According to Energy Intelligence data, the kingdom produced 9.5 million barrels a day in February, down 44,000 barrels a day from January. For the Bloomberg Intelligence dashboard on OPEC, type **BI OPEC <Go>**. JON ASMUNDSSON

VENEZUELA faces a deepening economic crisis as low oil prices strangle export revenue. Caracas residents line up outside a store for scarce groceries.

CRISTIAN HERNANDEZ/ANADOLU AGENCY/GETTY IMAGES

'HE'S A MAN OF FEW WORDS BUT NONE WASTED,' PONEMAN SAYS OF NAIMI. WHEN TURMOIL IN LIBYA DROVE UP OIL PRICES, **'HE REALLY CAME THROUGH.'**

supply cut during the financial crash, but they never did. And just two days earlier in Vienna, Naimi had attended an awkward meeting at which Vladimir Putin ally Igor Sechin, CEO of oil giant Rosneft, said Russia would agree to cuts, only to be overruled at the same meeting by Russian Energy Minister Alexander Novak.

Naimi next shot down an Algerian proposal, supported by seven member states, for a 5 percent output reduction levied only on OPEC producers. That might boost prices today, Naimi said, but wouldn't solve OPEC's longer-term problem with shale producers and declining demand growth. His reasoning prevailed, as usual.

Demand anxiety, always lurking in the Saudi psyche, had surged after U.S. President Barack Obama took office. At first, in 2009, Naimi told American diplomats he wasn't worried that alternative energy sources would reduce oil use because global consumption was soaring, especially in China and India, according to U.S. diplomatic cables. But six months later, in Ambassador Smith's 2010 memo to Energy Secretary Chu, the envoy said Saudi leaders "were caught off guard by the strength of the Administration's initial statements about its desire to move to a post-hydrocarbon economy and end dependence on imported oil."

Alarm was heightened, the ambassador reported, because the Saudis were just finishing a $100 billion expansion of their production capacity to 12.5 million barrels a day. "Saudi leaders are concerned that this oil may never be needed," Smith wrote. "They are less concerned about price forecasts than our expectations of the scope and pace of changes globally."

Other classified cables released by WikiLeaks described the Saudis as "obstructionist" and "schizophrenic" on curbing climate change—launching solar and carbon-sequestration projects at home while impeding multilateral talks abroad. "Part of the explanation for this schizophrenic position is that the Saudi Government has not yet thought through all the implications of a climate change agreement, in part because it may not fully understand the various demand scenarios," Smith wrote after the 2009 U.N. climate change conference in Copenhagen.

While Copenhagen didn't lead to any binding agreement, governments have tightened carbon emission limits and other environmental rules in the years since. Efficiency improvements have kept coming. And the Saudi government *has* been thinking through the implications.

Naimi had put off retirement because King Abdullah asked him to stay. After Abdullah's death on Jan. 23, King Salman kept Naimi as petroleum minister to signal consistency in Saudi policy during the transition. Still, Naimi is likely to soon have more time to devote to his university and the industrial and technological transformation he envisions for his country. As an Aramco executive and then as a globe-trotting oil diplomat, Naimi has shown great talent for bridging the divide between Westerners and the kingdom's traditional leaders. And he's overseen a Saudi industry that is an engine of science and progress.

In 2010, Naimi escorted Chu to visit King Abdullah at his palace in the desert oasis of Rawdhat Khuraim. The elderly monarch was in a philosophical mood and took the opportunity to pose a few questions to the Nobel laureate physicist, says Smith, who went along for the visit.

"Tell me how the universe was formed," the king asked, in Smith's recounting. Chu patiently laid out the story of the Big Bang theory. "What does that mean for God?" the monarch said. Chu and Smith conferred for a moment on an appropriate, diplomatic response. "There are some things we know, and for other things, we have God," Chu replied.

"And tell me, how did we get all this oil?" King Abdullah asked. As Chu described how organisms decomposed over millions of years, Naimi whispered in Smith's ear, "I've told him this a hundred times."

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With assistance from **Grant Smith** in London.

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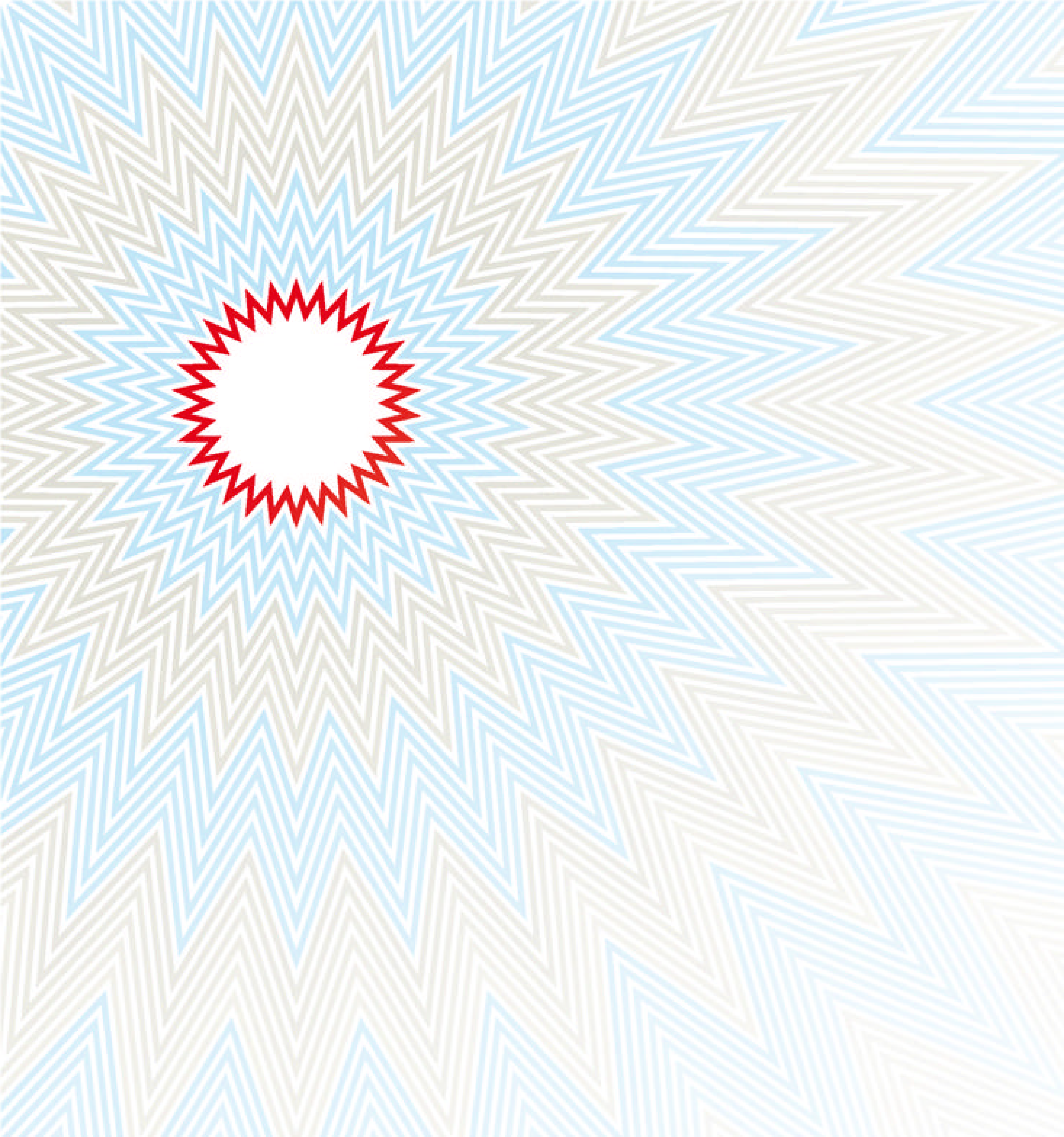
NIGERIA will grow about half as fast in 2015 as the average pace of the past 15 years, according to the International Monetary Fund. Lower oil revenue is depleting foreign-exchange reserves.



SOLAR EVANGELISTS

ENERGY OUTLOOK

ELON MUSK'S COUSINS LYNDON AND PETER RIVE ARE ON A QUEST TO MAKE SUN-GENERATED POWER CHEAP AND EASY.

BY **JOHN LIPPERT** AND **CHRISTOPHER MARTIN** | PHOTOGRAPH BY **RAMONA ROSALES**

Lyndon Rive perches on a customer's roof in San Mateo, California, where SolarCity is headquartered.

In September 2013, Hawaiian Electric Co. told thousands of customers they couldn't connect their new solar panels to its distribution grid. In some neighborhoods, HECO said, its system couldn't absorb any more unused energy from home solar arrays. The moratorium, which lasted 13 months, made Hawaii a central battleground in the effort by utilities to control the rapid growth of independent solar companies across the U.S. And it was a big deal to people such as Robert Gould, a retired Northwest Airlines pilot living near Honolulu. He'd just paid $53,000 to have solar panels installed.

Gould and other customers protested loudly to state officials. They finally got help from Lyndon Rive, the CEO of SolarCity. The San Mateo, California–based company is the biggest installer of rooftop solar panels in the U.S. and has 10,000 Hawaiian customers. Rive studied the situation and zeroed in on a key fact: HECO had never directly measured how much solar its grid could handle, relying on computer simulations instead. "Because the technology is brand-new, no one had ever done this in the field before," says Colton Ching, HECO's vice president for energy delivery.

SolarCity joined with HECO to run the tests, with help from the U.S. National Renewable Energy Laboratory in Golden, Colorado. They found that high-traffic circuits could absorb twice as much solar energy as the utility thought. After asking solar installers to reprogram equipment that connected them to the grid, HECO lifted its ban on new hookups late last year. Gould flipped the switch and connected his new panels to the grid in January.

Rive, 38, says the experiment in Hawaii was a step forward for him and his brother Peter, 41, and their famous cousin, Elon Musk, who helped found SolarCity in 2006. The trio is on a quest to reduce the world's dependence on fossil fuels—Musk with his Tesla electric cars, the Rive brothers by replacing coal- and natural gas–generated electric power with solar. What was groundbreaking in Hawaii was that regulators pressured HECO to join with SolarCity in redesigning the state's electricity grid, moving solar to the mainstream of the industry, Peter Rive says.

The Rives, like their cousin Musk, approach the fight against climate change as a moral crusade. Lyndon regards the replacement of fossil fuels with clean energy as an urgent necessity. "We have to accept that what is happening today is impossible," he says. "It will be suicide to continue that process."

SolarCity is installing solar panels on homes and commercial businesses in 15 states. It has 190,000 customers, expects to double that to 400,000 this year, and is aiming for a million by 2018. As they grow their businesses, SolarCity and other energy upstarts—its chief competitors are Vivint Solar and the home solar unit of NRG Energy—are waging daily battles with big utilities. They accuse the electricity establishment of trying to thwart their expansion and, in some states, of competing unfairly by installing its own rooftop solar panels while still charging regulated, cost-plus rates that guarantee a profit.

Ching says HECO bears no ill will toward independent solar companies. "Solar rooftops are part of our larger plan to get 65 percent of our power from renewable sources by 2030," he says. One reason: Island residents now pay 38 cents per kilowatt-hour for electricity, three times the national average. At 12 percent, Hawaii already leads the nation in the proportion of residents with rooftop solar.

Yet even as HECO agreed to increase the number of new solar connections, it asked the state Public Utilities Commission for permission to cut nearly in half the money it will pay future solar customers for sending power to the grid. The utility, whose parent company saw revenue drop 5.1 percent in the fourth quarter, also wants to charge future solar customers $71 a month to stay hooked up. Ching says these measures are necessary to even the playing field at a time when solar installations are heavily subsidized by the state and federal governments and the utility itself. Installers of solar panels get to take 30 percent of the cost off their federal tax bill. And 44 states, including Hawaii, have adopted laws or regulations guaranteeing homeowners retail prices for power they feed onto the grid, although utilities pay wholesale when they buy power from each other.

These regulations, called net metering, made sense when solar was in its infancy, says Ching, but no longer. Beyond the price guarantees, companies such as SolarCity are not regulated by state utility commissions, though those commissions have power over how expensive it is for them to wedge themselves onto the grid.

SolarCity and other panel installers are fighting solar surcharges that at least a half-dozen states are attempting to impose. In early March, the company filed suit against an Arizona electric utility called the Salt River Project, accusing it of anti-competitive practices for levying fees

Sunny Money

SolarCity is the No. 1 U.S. installer of home solar panels.

	SolarCity	Vivint Solar	NRG Home Solar
Headquarters	San Mateo, California	Provo, Utah	Princeton, New Jersey
Market value[1]	$4.6 billion	$1.1 billion	$8.0 billion[3]
Market share[2] (U.S. residential installs)	34%	13%	2%
Megawatts deployed[2]	1,042	228	53
Installed cost per watt[2]	$2.86	$2.96	$3.25

[1]As of March 16. [2]As of Dec. 31. [3]Includes parent company. Sources: Bloomberg, GTM Research, companies

Left to right: **Peter Rive**, **Elon Musk**, and **Lyndon Rive** speak at the December 2012 IPO of SolarCity.

MARK VON HOLDEN/AP IMAGES

on home solar systems that SolarCity says are so severe they cut installations by 96 percent. Salt River pricing manager John Tucker acknowledges that new solar hookups have declined but says it's because SolarCity needs to do a better job of teaching homeowners that solar makes sense even at the new, higher rates.

Controversy aside, SolarCity is at the leading edge of a transition from centralized power plants and one-way transmission lines to a much more complex system, says Ben Paulos, an analyst at GTM Research in Boston. In the future, Paulos says, homeowners, regulated utilities, and independent companies such as SolarCity will all be capable of not only generating but storing power. They'll all possess sophisticated sensing equipment to manage both supply and demand across the grid in response to real-time fluctuations in price. "Ten years ago, the controls you needed to monetize this, to make sure everybody gets paid for each of these services, didn't exist," says Paulos. "Now they do. It's the Internet of electricity."

The Rive brothers' goal for SolarCity is to provide a comprehensive service that includes the sale or lease of solar panels, plus installation, financing, and servicing. "We want to make sure it's as easy to go solar as it is to get DirecTV," Lyndon says. "No capital investment, no upfront money, nothing." SolarCity says it has targeted states where it knows its panels can beat the price of conventional electricity generation. Within a year or two, it expects to greatly expand its ability to store sun-generated power for future use, utilizing batteries produced by Musk's Gigafactory, now under construction in Nevada. In mid-March, SolarCity announced it will go into the business of producing microgrids—clusters of solar panels and batteries that will allow customers in remote locations to consume power 24 hours a day.

SolarCity also has something to offer the finance community. The company is bundling future cash flows from loans and leases and selling them to investors. The Rives are also bundling the 30 percent federal investment tax credit that SolarCity gets for each installation. As an unprofitable startup, it doesn't need the credits to defer taxes, so it sells them to other companies. In February, Google invested $300 million in a so-called tax-equity fund Rive created for this purpose.

Like its corporate cousin Tesla Motors, SolarCity needs to persuade investors and shareholders that it can make a go of it. Last year, the company lost $56 million on $255 million in revenue. As revenue swells to an estimated $764 million in 2016, so will losses—to as much as $543 million, according to analysts surveyed by Bloomberg. SolarCity went public in 2012, and its shares sold for $47.53 on March 16, down from $74.01 in September, after lower-than-expected fourth-quarter revenue.

In a conference call to discuss 2014 earnings, Lyndon Rive reported that improved technology now allows SolarCity to mount solar panels on flat-roof commercial buildings in three days instead of the three weeks it used to take. During 2014, the company's share of the U.S. rooftop solar market rose 9 percentage points, to 34 percent, as mom-and-pop installers failed to match SolarCity's nationwide marketing clout, GTM says.

The Rive brothers come from an entrepreneurial tradition. Lyndon and Peter grew up in Pretoria, South Africa. Their mother, Kaye, is the twin sister of Musk's mother, Maye. Their family includes business owners going back generations. "They installed a strong, tenacious thread of DNA," says Nancy Pfund, a managing partner at San Francisco–based DBL Investors and a SolarCity board member. "They all get that business success relies on making the world better."

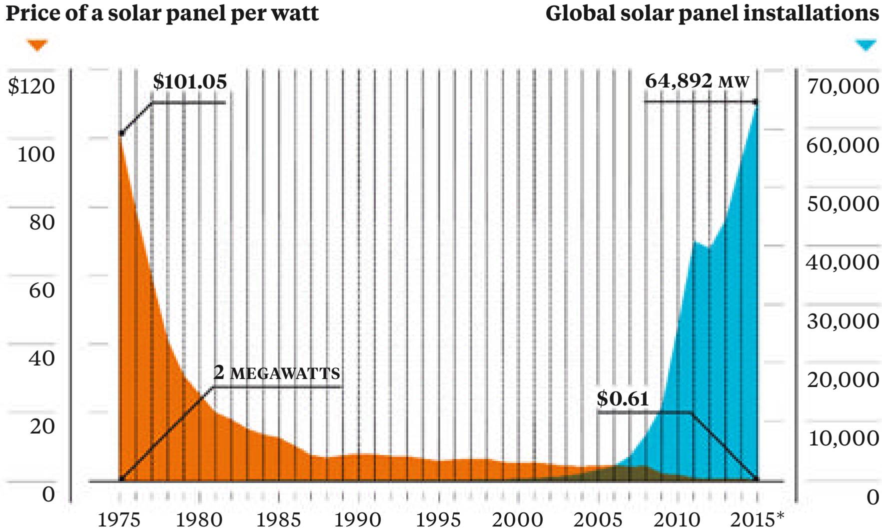
Lyndon had no such goal when he made his first trip to California in 1998. He was there for an underwater hockey tournament, a game in which players wearing

snorkels whack a puck around the bottom of a pool. Rive decided he liked California. He returned to Pretoria, sold a homeopathic medicine company he'd started in high school, and moved to Silicon Valley. In 1998, he and his older brother Russell started an information technology outsourcing company called Everdream. Peter joined the company later. They sold Everdream to Dell Inc. in 2007 for $120 million.

By that time, Lyndon and Peter had already gone solar. In the summer of 2004, Musk and his cousins had driven together to the Burning Man music festival in Nevada, and on the way, Musk persuaded them solar was about to explode, Lyndon says. They started SolarCity two years later, with Musk putting up much of the startup money. As of March 16, he owned 21 percent of SolarCity shares, worth almost $1 billion. Lyndon and Peter each owned shares worth about $100 million on that date.

Solar on Fire

As prices have dropped, installations have skyrocketed.



*Estimate. Sources: Bloomberg, Earth Policy Institute, www.earth-policy.org

FOR MOST OF SOLARCITY'S history, it bought solar panels from China. In 2014, the company moved into manufacturing, spending $200 million to buy Silevo, a California company that claims its solar cells can capture 24 percent of the available energy in sunlight, a third more than most systems. SolarCity also inked a deal in which New York state contributed $750 million toward construction of a factory in Buffalo where the company will make Silevo panels.

The Buffalo plant is part of a wide-ranging plan by New York state to promote production of energy from renewable sources. This includes rewriting regulations so that independents like SolarCity and traditional utilities will both profit as solar grows. In Arizona, by contrast, utilities are fighting to keep their new rivals out, Rive says. SolarCity's lawsuit against the Salt River Project follows a two-year battle to prevent Arizona Public Service from charging solar customers an extra $50 a month to help maintain its grid. APS launched an election-style campaign complete with billboards and television ads. In the end, regulators approved a monthly fee of just $4.90.

Arizona and other state officials say the surcharges are fair because solar panel owners are benefiting from subsidies that citizens who don't own homes or can't afford solar panels aren't entitled to. The utilities also declare they, too, are fighting carbon emissions that contribute to climate change. HECO announced in December it's building six large solar farms on Oahu. In February, Duke Energy accelerated its rooftop solar installations when it agreed to buy a majority stake in REC Solar, which generates solar power at, among other places, the Dole Plantation on Oahu. And NRG Home Solar says it plans to install 2,400 megawatts of rooftop solar by 2022; SolarCity now stands at 1,042 megawatts.

Lyndon Rive says he's not worried as long as utilities don't use their cost-plus advantage to bludgeon competitors and slow the pace of technical innovation. "I welcome utilities to compete with us, just not in the service areas where they already have a monopoly and the extremely low cost of capital that comes with it," he says.

Back in Hawaii, Robert Gould is still angry he had to wait more than a year to connect his solar panels to the grid. He says he's eager for Musk to build storage batteries for solar systems, so he won't have to rely on HECO at all. "As storage costs come down, more and more people are going to say, 'Take this grid and shove it,'" Gould says. "It'll take 20 years, maybe less, but these utilities are going to find themselves in a world of hurt."

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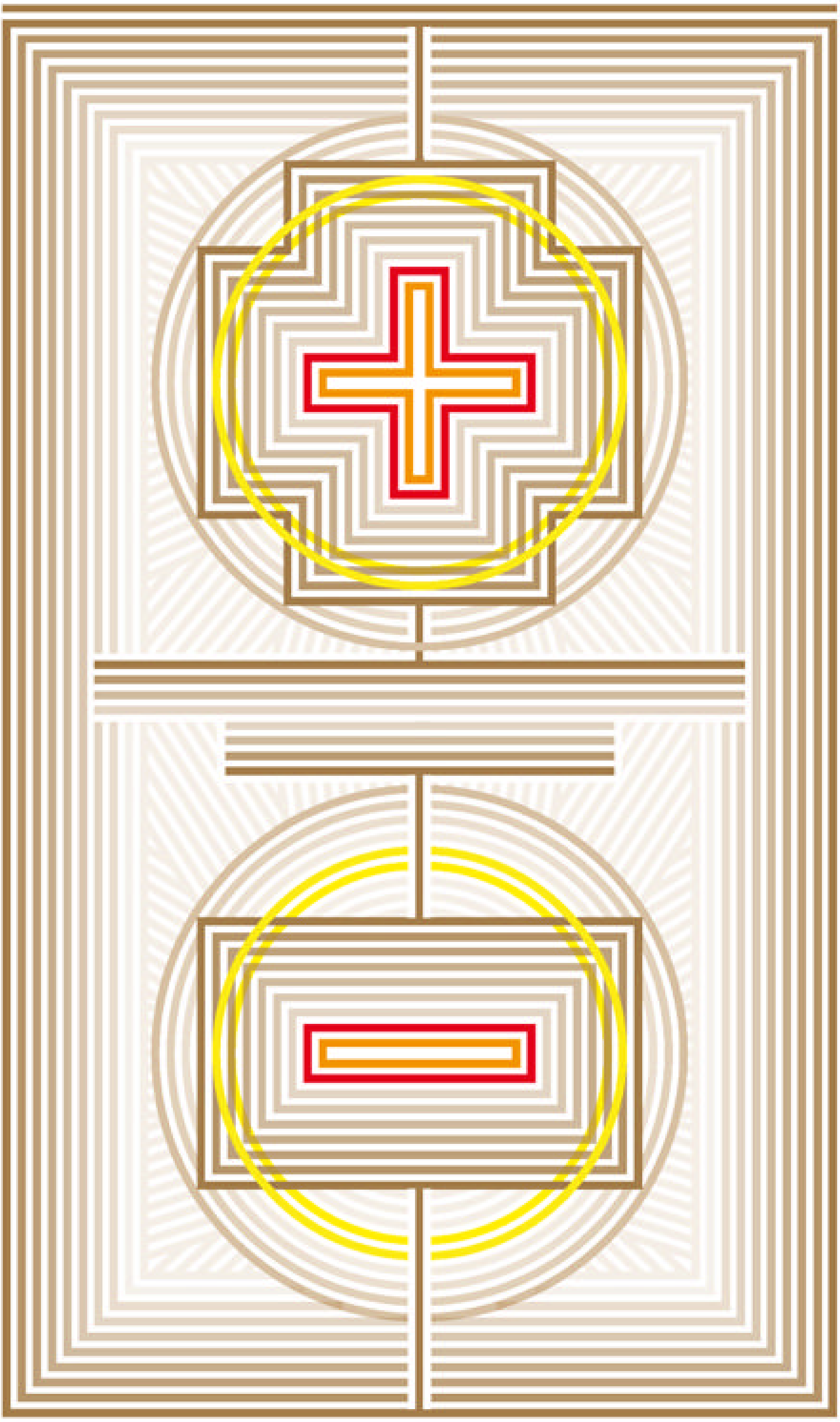
BLOOMBERG TIPS | Tracking SolarCity

You can use the enhanced Holders By Size (HDS) function to see the estimated price per share paid by Elon Musk and the Rive brothers for their holdings of SolarCity. Type **SCTY US <Equity> HDS COST-BASIS <Go>** on the Bloomberg Professional service. For more information about the calculations, click on the What's New button on the red tool bar. To analyze a SolarCity 2.75 percent convertible senior note that matures in 2018, type **EJ725335 <Corp> OVCV <Go>** for the Convertible Valuation function. For the Bloomberg Intelligence dashboard on solar energy equipment, type **BI SOLR <Go>**. Type **BNEF <Go>** for the Bloomberg New Energy Finance home page. JON ASMUNDSSON

BUILDING A BETTER



PROFESSOR DONALD SADOWAY remembers chuckling at an e-mail in August 2009 from a woman claiming to represent Bill Gates. The world's richest man had taken Sadoway's Introduction to Solid State Chemistry online, the message explained. Gates wondered if he could meet the guy teaching the popular MIT course the next time the billionaire was in the Boston area. "I thought it was a student prank," says Sadoway, who's spent more than a decade melting metals in search of a cheap, long-life battery that might wean the world off dirty energy. He'd almost forgotten the note when Gates's assistant wrote again to plead for a response.

A month later, Gates and Sadoway were swapping ideas on curbing climate change in the chemist's second-story office on the Massachusetts Institute of Technology campus. They discussed progress on batteries to help solar and wind compete with fossil fuels. Gates said to call when Sadoway was ready to start a company. "He agreed to be an angel investor," Sadoway says. "It would have been tough without that support."

Sadoway is ready. He and a handful of scientists with young companies and big backers say they have a shot at solving a vexing problem: how to store and deliver power around the clock so sustainable energies can become viable alternatives to fossil fuels. Today's nickel-cadmium and lithium-ion offerings aren't up to the task. They can't run a home for more than a few hours or most cars for more than 100 miles (160 kilometers). At about $400 per kilowatt-hour, they're double the price analysts say will unleash widespread green power. "Developing a storage system beyond lithium-ion is critical to unlocking the value of electric vehicles and renewable energy," says Andrew

BY CHRISTOPHER MARTIN

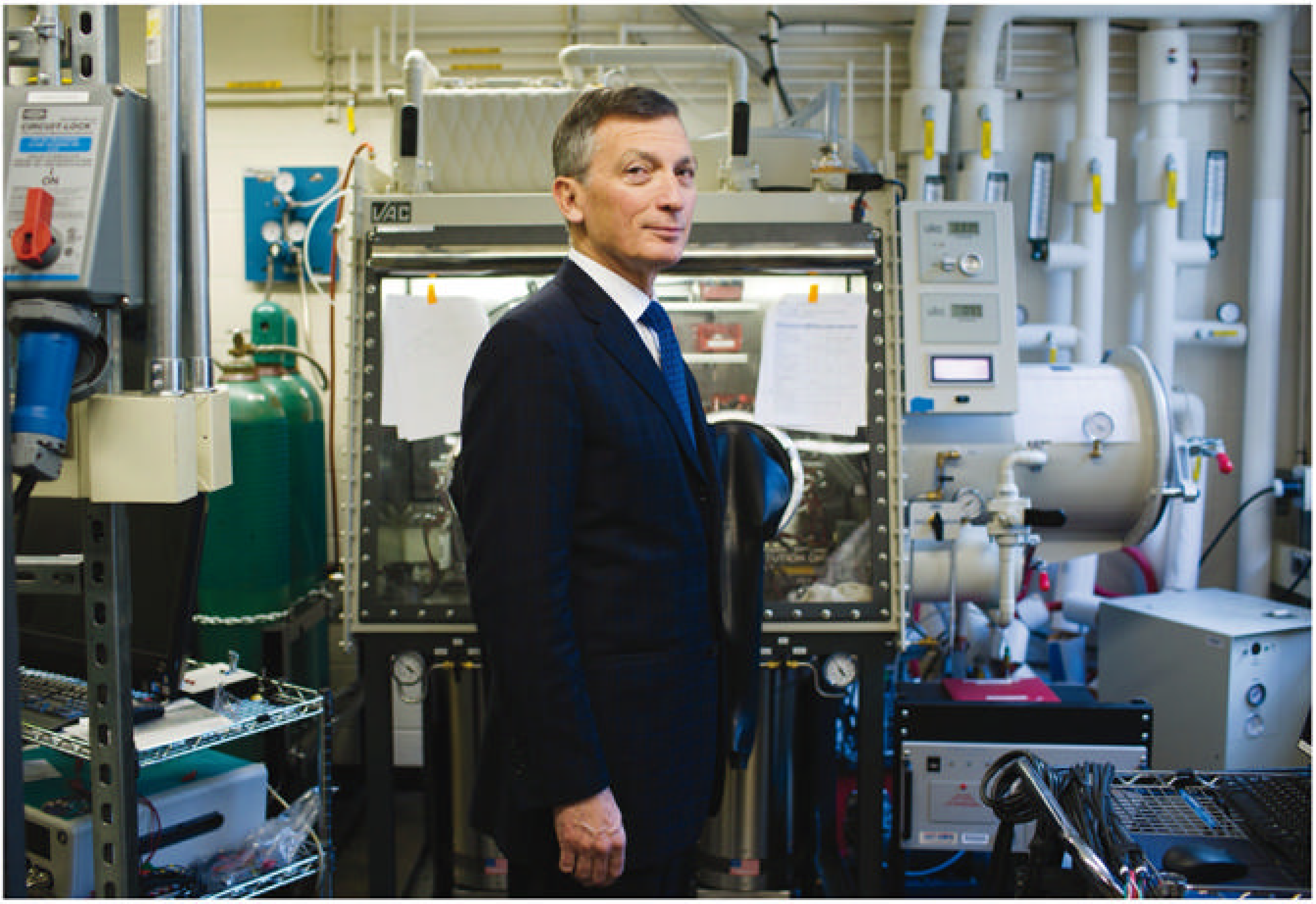
BATTERY (FINALLY)

YOUNG COMPANIES STAKED BY BIG BACKERS ARE CHALLENGING FOSSIL FUELS WITH NEW WAYS TO HOLD SUN AND WIND POWER IN THE $50 BILLION ENERGY STORAGE MARKET.

Chung, a partner at Menlo Park, California–based venture capital firm Khosla Ventures.

The timing for inventors—and investors—may finally be right. Wind turbines accounted for 45 percent of new U.S. power production last year, while solar made up 34 percent of fresh capacity worldwide. Storing this energy when the sun isn't shining or a breeze isn't blowing has remained an expensive hurdle. Battery believers say that's changing. They've invested more than $5 billion in the past decade, racing to get technologies to market. They're betting new batteries can hold enough clean energy to run a car, home, or campus; store power from wind or solar farms; and make dirty electricity grids greener by replacing generators and reducing the need for more fossil fuel plants. This market for storage capacity will increase almost 10-fold in three years to 2,400 megawatts, equal to six natural gas turbines, Navigant Consulting says.

MIT's **Donald Sadoway** says he's perfected the chemistry for a 10-ton liquid metal battery.



PHOTOGRAPH BY **M. SCOTT BRAUER**

Gates made good on his pledge to Sadoway with an undisclosed investment in 2011. The money helped form Ambri, a nod to the company's roots in Cambridge, Massachusetts. (Gates declined to comment for this story.) Billionaire Nick Pritzker and his son Joby are backing Pittsburgh-based Aquion Energy through their Prelude Ventures and Tao Invest funds. At Aquion, a Carnegie Mellon University professor is repurposing a factory that made Volkswagens and Sony TVs to fashion batteries for residences and hotels. Technology from California's Lawrence Berkeley National Laboratory has support from VC Vinod Khosla. The top three U.S. automakers are testing the lab's lithium polymer product, which powers cars and homes. Sales are expected next year.

More money will flow to the global, $50 billion-a-year battery industry as the U.S., China, and Germany scramble to cut greenhouse gases. The market includes everything from flashlights and home solar to power sources for islands and storage that can fortify grids. A dozen startups are chasing the pot in a field dominated by Panasonic and LG Electronics, which are advancing their own offerings. "It's a fantastic time, with some really strong technologies," says Venkat Srinivasan, who leads storage research at Berkeley Lab.

Sadoway is one of the first out of the gate. This year, he plans to ship six 10-ton prototypes packed with hundreds of liquid metal cells to wind and solar farms in Hawaii, a microgrid in Alaska, and a Consolidated Edison substation in Manhattan. Ambri's battery will store power Con Ed offloads when demand is low. Then, rather than cranking up another coal- or gas-fired plant, the utility will drain the battery when New Yorkers want more juice.

Sadoway, a 65-year-old Canadian, defies the nerdy inventor mold. He's been known to teach his class in a tuxedo while serving champagne. Yet he's all science when explaining batteries. He says Ambri can top lithium-ion on price and longevity with tricky chemistry that he and a former student have finally perfected. The battery combines two metals Sadoway won't disclose that have different weights and melting points. He separates them with a salt layer. Electric currents heat the metals to as much as 700 degrees Celsius (1,292 degrees Fahrenheit) to pass electrons through the molten salt. That helps the metals hold more energy. Unlike the lithium-ion in laptops, which can take about 400 charges and last four years, Sadoway says his batteries can take 10,000 charges and work for at least a decade.

Sony introduced the now-ubiquitous lithium-ion technology in 1991. The batteries, with their flammable liquid electrolyte, never overcame original flaws. They can burst into flames and require toxic solvents with names such as N-methylpyrrolidone.

More frustrating for investors, no one so far has come up with a clear route to bringing down prices while ramping up production. Tesla Motors Chief Executive Officer Elon Musk says he can do it. He's betting $5 billion that a new plant near a lithium mine in Nevada will make his Teslas go more than 200 miles at about $35,000 per

Carnegie Mellon's **Jay Whitacre**, left, founded Pittsburgh's Aquion. **Scott Pearson** is CEO.

PHOTOGRAPH BY **ROSS MANTLE**

car by 2017. That's about one-third the cost of today's priciest $100,000 Model S. Analysts estimate Tesla's batteries cost less than $400 a kilowatt-hour. Musk has said he wants to cut costs by 30 percent with full output. Tesla declined to comment on battery prices. To answer critics who say Teslas lose their green cred by plugging into a grid, Musk offers solar panels for homes and some charging stations.

Silicon Valley venture firm Kleiner Perkins Caufield & Byers jump-started today's race to beat lithium-ion in 2007. VCs asked one simple question: What should the ideal battery do? The firm, known for spotting future tech icons such as Netscape and Google, gathered analysts and partners at its Menlo Park headquarters. They came up with a list of "impossible demands." Then they set out to find the technology—hopefully lurking in a chemist's lab—ready to be refined and eventually brought to market, says Ray Lane, partner emeritus at Kleiner.

Kleiner dispatched Bill Joy, a co-founder of Sun Microsystems who was a partner at the firm, and David Wells, from its green-tech division, to Pittsburgh. They visited Jay Whitacre, a lanky cyclist with a Ph.D. in materials science. Whitacre was tinkering with battery chemistries while teaching Engineering the Materials of the Future at Carnegie Mellon. "It's a very short list that can beat lithium-ion," says Lane, former president of software giant Oracle who's now chairman of boards at both Aquion and Carnegie Mellon. "Jay Whitacre was the only one who said he could do it. I didn't believe him at first."

Believing him or not, Kleiner took a chance. It gave Whitacre $1.6 million in 2008 to accelerate his research. He built a cell using an updated version of a saltwater battery produced in 1800 by Alessandro Volta, the father of the electric battery. Six months later, Whitacre, now 43, was ready to take his sodium-based battery out of his lab at the university. He called the company Aquion for its aqueous-ion chemistry.

Hany Eitouni, top, helped create a dry lithium battery for California's Seeo, run by **Hal Zarem**.

Lane and his partners were so pleased with Whitacre's early progress they agreed to invest a further $7 million in 2009. The firm has helped Aquion raise more than $172 million, including chunks from Gates and Nick and Joby Pritzker. Nick is a cousin of Hyatt Hotels founder Jay Pritzker, who died in 1999. Aquion hasn't released individual investments because it's privately held. CEO Scott Pearson says that may change in the next year. "We're one round away from an IPO or an equity deal," he says.

Aquion leases a three-story redbrick house in Pittsburgh's gritty Lawrenceville neighborhood. It's close enough for Whitacre to bike the 2.5 miles from campus. On a bitterly cold February day, with wind blowing off the Allegheny River, Whitacre said he's developed what will become the cheapest nontoxic and long-lasting battery for a home or a hospital. It provides steady power for eight hours or more, discharging

BLOOMBERG TIPS | Who's Buying Batteries?

You can use the Merger & Acquisition Deal List (MADL) to view the transaction in which a group led by Total bought a minority stake in Ambri. Type **9474377Z US <Equity> MADL <Go>** on the Bloomberg Professional service. Click on the deal announced on April 30, 2014. To create a news alert to notify you when a story mentioning Aquion Energy appears, type **NLRT <Go>** for the News Alerts/Filters function. Click on the New Alert button on the red tool bar. Enter *AQUION* and click on the name of the company in the list of matches. Click on Save This Search and then on Save. JON ASMUNDSSON

PHOTOGRAPHS BY **RYAN YOUNG**

solar energy it gathers during the day. Whitacre shows off the fruit of his labor: a 28.6-kilowatt-hour battery module the size of a clothes dryer. It's running the staff refrigerator, coffee maker, and water heater.

Aquion's robots are hard at work 30 miles east. Designed to package chocolate candies, they're instead plucking pucks of black carbon and manganese powders and placing them in casings to be filled with brine. Nearby, 50 pallets of boxed-up batteries are heading to Hawaii's big island to power the 8-acre (3-hectare) estate of Earl Bakken, inventor of the external, wearable pacemaker. They'll store electricity generated by 512 solar panels, replacing propane engines.

Whitacre is gearing up to produce enough batteries every year to store 200 megawatt-hours of power. Initially, he expects to sell to locales with diesel generators. "Islands and microgrids are the first big natural markets," he says. Eventually, Aquion wants to add four more production lines to the current one. That could reduce cell costs to as little as $100 per kilowatt-hour, CEO Pearson says.

Hany Eitouni, a bespectacled chemical engineer, is also chasing $100 cells with technology he helped develop at Berkeley Lab. Eitouni's porous material lets electrons flow in a new dry lithium battery that's a cousin to current models. Khosla Ventures and Samsung Venture Investment bet $17 million on Eitouni's Seeo, bringing venture funding to more than $42 million since 2007. Eitouni, 37, says his latest rolled packets of lithium polymer cells are the size of a briefcase and hold two to three times the energy per weight of today's liquid lithium battery. That's key for electric vehicles to travel more than 200 miles per charge. What's more, his solid polymer loses less energy in the form of heat, a flaw in current lithium batteries, he says.

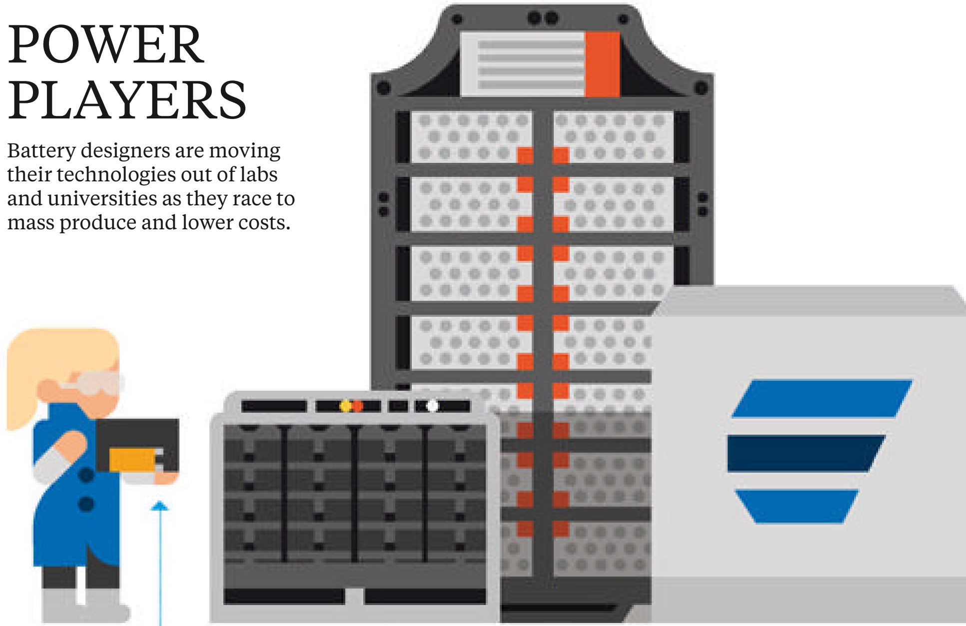
As the fog lifts at an East Bay industrial park, Seeo technicians in white coats and safety goggles manipulate harsh chemicals that clean metals in the batteries' core. Machines roll 40 layers of lithium foil into a cylinder with two polymer layers that are pressed into a pouch. Eitouni boasts of passing grades for his batteries "in the high 90s." Seeo expects to break under the $100-per-kilowatt-hour mark as it moves its best designs to full production during the next few years, says CEO Hal Zarem. "Seeo can be very cheap as they grow to scale," says Jeremy Neubauer, senior engineer at the National Renewable Energy Lab's Center for Transportation Technologies and Systems.

Phil Guidice, the CEO who's running Sadoway's Ambri, says new batteries emerging with the help of big backers will finally enable renewables to compete with fossil fuels. "Khosla, Gates, Musk, and the Pritzkers are all excited about changing the world in a better way, and they're swinging for the fences," Guidice says. "We're getting closer every day."

Christopher Martin covers renewable energy at Bloomberg News in New York. cmartin11@bloomberg.net

POWER PLAYERS

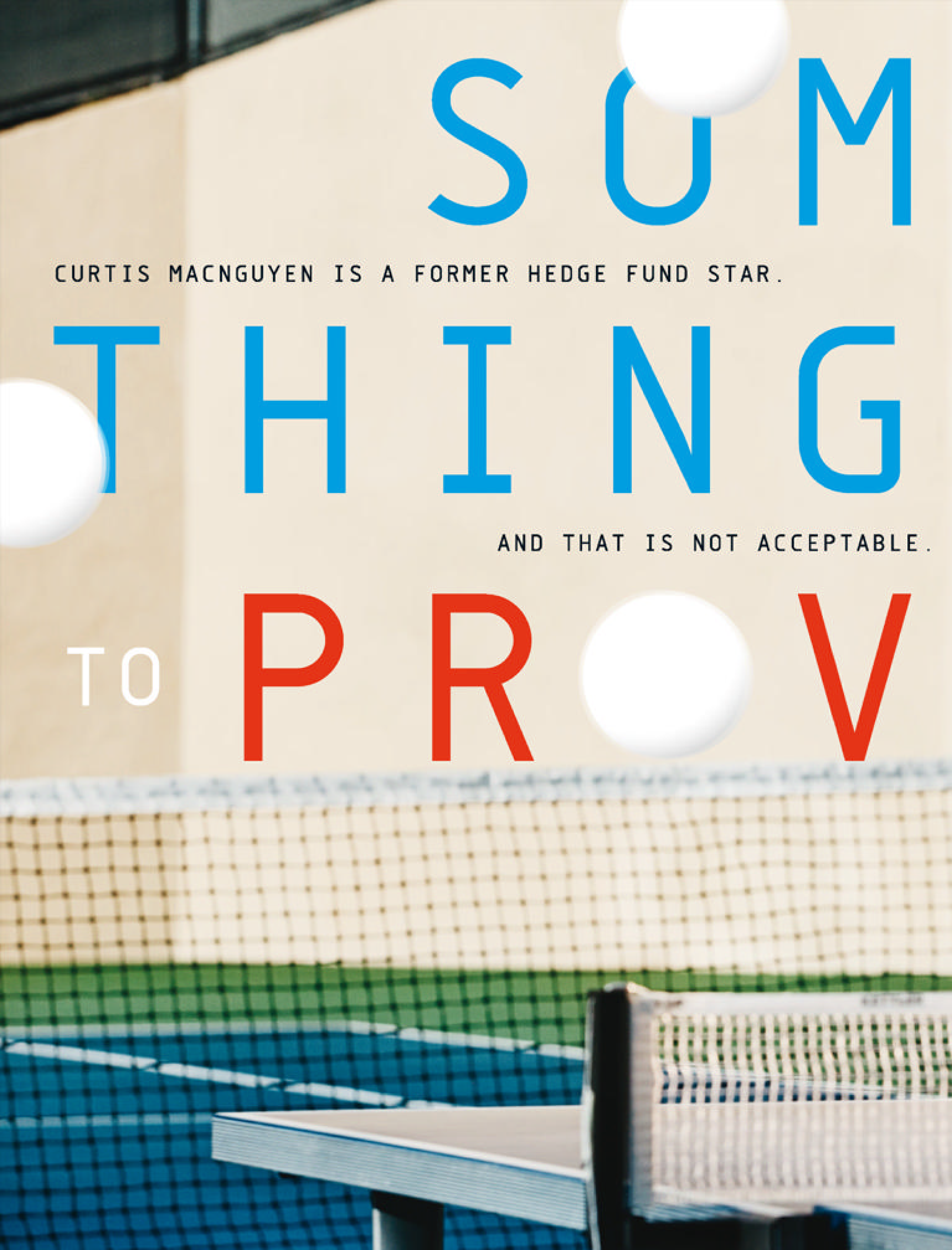
Battery designers are moving their technologies out of labs and universities as they race to mass produce and lower costs.



	SEEO	AQUION	TESLA	AMBRI
WATTAGE	**1.6** kilowatt-hours	**28.6** kWh	**85** kWh	**200** kWh
SIZE	18" x 10" x 3"	46" x 40" x 52"	9' x 4' x 3"	6' x 6' x 6'
TECHNOLOGY	**Dry electrolyte**	**Sodium-ion**	**Lithium-ion**	**Molten metal**
WEIGHT (POUNDS)	22	3,000	1,300	20,000
COST PER kWh* (TARGET COST)	About $400 ($100 in 3–5 years)	About $400 ($100 in 3–5 years)	Less than $400 (about $250 in 3–5 years)	Less than $500 (no further estimate)
POTENTIAL USES	Electric vehicles, homes	Homes, offices, hospitals, utility storage	Now in Model S; planned for homes, offices	Utility storage, hospitals
BENEFITS	Nonflammable, high energy per kilogram, fewer manufacturing steps	Nonflammable, no toxic components, automated manufacturing, 10-year life or more	Highly tested, widely produced, high energy per kilogram	Nonflammable, no toxic components, 10-year life or more
DRAWBACKS	Limited testing, expensive materials, 3- to 5-year life	Limited testing, heavy	Requires cooling, 3- to 5-year life, difficult to manufacture	Limited testing, heavy

**Companies' estimated cost per module; analyst estimates for Tesla. Sources: Companies, analysts*

ILLUSTRATION BY **HEY STUDIO**



SOM THING TO PR V

CURTIS MACNGUYEN IS A FORMER HEDGE FUND STAR.

AND THAT IS NOT ACCEPTABLE.

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BY ANTHONY EFFINGER

PHOTOGRAPHS BY BENJAMIN RASMUSSEN

E

Curtis Macnguyen says table tennis, more than any other sport, gets him in a zone of pure concentration.

FOR FUN, CURTIS MACNGUYEN LIKES TO RUN ALONG THE SEA FLOOR IN 15 FEET OF WATER, CARRYING A BOULDER.

He does it offshore from his house on the blue-watered Kona Coast of Hawaii's Big Island, not far from similar spreads owned by Michael Dell and buyout kingpin George Roberts.

Macnguyen, 46, is a hedge fund manager. An old-school hedge fund manager. His methods are what you'd expect from a guy who carries rocks underwater: lots of hard work, almost no big sprints, and steady progress, all under pressure.

Macnguyen brings his A game to everything, and has since childhood, when he bet on Trivial Pursuit and Pictionary with his six brothers. He has a tennis court in his backyard in the Brentwood neighborhood of Los Angeles, where he hits against local pros. Mats Wilander, winner of eight Grand Slam titles, came for a few sets in March. Macnguyen's golf handicap is 6, and he never plays without a little money on the line. A wager, even a small one, makes him step up his game. He recently lost $100 to Matt Kuchar, ranked No. 14 in the Official World Golf Ranking. He just built a gym—Tuscan style, like his house—so he could do a workout recommended by Marcus Elliott, a doctor and biomechanist who trains the best players in the National Basketball Association.

"Every guy who's really successful at anything wakes up and says, 'How can I do this better?'" Macnguyen says. (He's Vietnamese, but his name sounds Irish. It's pronounced like *McWin*.) He's sitting on a covered patio at his house on a bright November day sipping iced tea made by a private company he's backing. For an hour before, he hammered table tennis shots at a former national champion from South Korea (and *Playboy* model) named Soo Yeon Lee. He loves pingpong because it gets him in the zone—that rarefied state of total concentration where time vanishes and maximum ability emerges. "You're out of your body, watching yourself," he says, "and you can get any ball that comes in."

Macnguyen is every bit as intense at Ivory Investment Management, the $3.5 billion hedge fund firm he founded in November 1998. Through the end of 2014, his Ivory Flagship Fund returned 346 percent, or 9.7 percent a year. That's twice the 139 percent delivered by the Standard & Poor's 500 Index.

Even more impressive: Because Macnguyen hedges his bets by balancing long and short positions, he had, on average, about one-fifth of investors' money exposed to potential losses. The S&P 500 is 100 percent exposed, by definition. When the market fell during those years, he either made money or lost very little. And when it rose, his portfolio often rose much more.

Macnguyen's methods have made him rich. He likes Hawaii so much that he and a group of investors bought 873 acres (353 hectares) of oceanfront land that they're developing. He gets there from Los Angeles on his very own Gulfstream G450.

But that's not enough for Macnguyen. He could own every white-sand beach in the Pacific and not be content. Lately, he's been pretty ticked off—with himself. A person could look at his track record and conclude that his best years are behind him. And that is just not acceptable.

In 1999, its first full year of operation, Ivory Flagship returned 28 percent, compared with 21 percent for the S&P 500. Even better, when the index fell 9 percent the next year, Macnguyen made 17 percent.

Investors who didn't love him already should have swooned in 2008. The market plunged 37 percent that year, and Ivory Flagship fell just 7.6 percent. When the rebound came in 2009, Macnguyen was ready. Investors had been pestering him for a new fund that would take more risk, and he obliged with the Ivory Optimal Fund, now his largest. It jumped 28 percent that first year, compared with 26 percent for the S&P 500.

Then something changed. In 2010, Ivory Flagship lagged the index by 13 percentage points. In 2011, he lost 3.6 percent in Flagship while the market rose 2.1 percent. Ivory Optimal did worse. His mojo was missing in action.

"I never kicked a dog or smashed a computer or even yelled at anyone," Macnguyen says. "I was just frustrated and pissed off at having to keep explaining to investors that the environment was tough for our strategy. I've always felt that we're in a no-excuse business. Just like high-level competitive sports, no matter how

tough the conditions are, it shouldn't matter, because you just have to be better than your competitors."

Macnguyen, like most hedge fund managers, lives pretty high up in psychologist Abraham Maslow's hierarchy of needs. Food, water, sleep, sex? Check. Security, employment, health? Yep. Friendship, family, intimacy? Check, again. (He's married and has a stepson, 21, and a son, 7.)

What began to elude him, it seems, is the next level: self-esteem, confidence, and perceived respect from others. He grumbles about rivals getting more attention—and money to manage—despite inferior performance. He singles out a doppelgänger (at least on paper): a former investment banker from an Ivy League school who's also 46: David Einhorn, who runs Greenlight Capital. They worked together at a small hedge fund firm called Siegler, Collery & Co. in 1993. Since it started in 2009, Ivory Optimal has returned 113.5 percent, edging Greenlight's 112 percent for the same period. Yet Greenlight manages $12 billion, almost four times what Ivory does, and that bothers Macnguyen. "The only difference between me and Einhorn is that he's higher profile and I'm purposely very low profile," Macnguyen says. "Plus, I'm supercompetitive and will only get better over time."

In conversation, Macnguyen toggles between bravado, like that, and self-flagellation. He frets about recent years when he failed to do the single thing hedge fund managers get paid for: generating alpha. Alpha is profit that doesn't come from the whole market going up or down. Anyone can get lucky and make big money by taking a big risk. Alpha is different. It's return you get beyond the risk you take. And hedge fund managers have to produce enough to cover their fees. Ivory's are an industry-standard 2 percent of assets per month plus 20 percent of annual gains.

In 2010 and 2011, few of Macnguyen's picks worked. He shorted Amazon.com, betting that earnings would tumble as the company invested heavily to keep revenue rising. Sure enough, earnings fell, but investors didn't care, and the stock rose. He bought shares of Hospira, a maker of injectable drugs, when they slumped into the $40s from close to $60 in 2011. Then the company warned that regulatory issues had slowed production at a plant in Rocky Mount, North Carolina, and the stock dropped into the $20s. Macnguyen tried to hang on for the rebound he expected, but the losses mounted. "For every winner we had, we had a loser," he says. "We didn't add a lot of alpha for two years, and that is painful for a guy like me."

It's a familiar story. Managers of equity funds, once accustomed to beating the S&P 500, have, as a group, been thrashed in each of the past six years, according to an index of equity funds tracked by Hedge Fund Research in Chicago, and have bested the index in just three of the past 12.

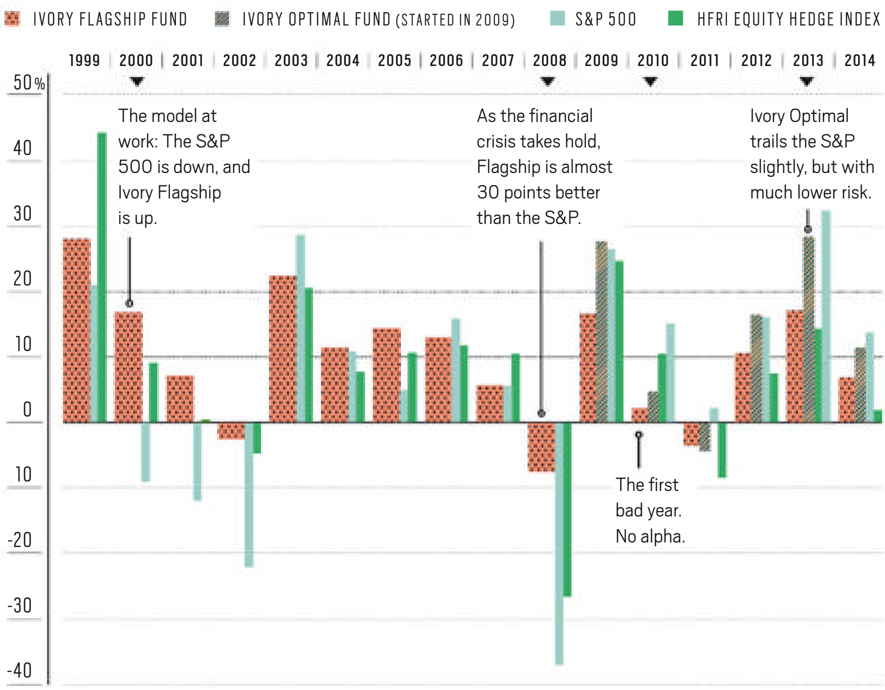
Explanations—or excuses—abound: There's more competition now as some 10,000 hedge funds look for stuff to buy with $3 trillion they've collected from pensions, endowments, and rich people; the U.S. Federal Reserve's dovish interest rate policy won't let the market fall; hedge funds do better in down years, and the U.S. stock market hasn't had one in six years. Many of the great ones have given up. Jeff Vinik, who managed the famed mutual fund Fidelity Magellan from 1992 to 1996, shut his hedge fund, Vinik Asset Management, in 2013 and returned $6 billion to investors after ill-timed bets on stock indexes and gold-mining shares.

There may be more at work. Nobel laureate Daniel Kahneman wrote in his 2011 book, *Thinking, Fast and Slow*, that stock-picking managers exist because of an "illusion of skill" and add no value compared with passive—and cheaper—index investing.

"It's very difficult to do what these people are trying to do," says Matthew Litwin, head of manager research at Greycourt, a consultant to 100 wealthy families and institutions with a total of $9 billion to invest. (He puts his clients' money in a variety of vehicles, including, occasionally, hedge funds. He declined to

CAREFUL, NOW

Ivory Capital's hedge funds truly hedge, with the idea of limiting risk even if that limits returns when prices are rising.



Source: Bloomberg

comment specifically on Ivory.) "Most people will fail."

Macnguyen isn't buying into any illusion of skill. He agrees that most managers will fail. He just doesn't intend to be among them.

MACNGUYEN'S ARC TOWARD an absurdly high net worth is as unlikely as any American's. He was born in Cam Ranh Bay in 1968, the same year the North Vietnamese army surprised the south with the Tet Offensive, taking the Vietnam War to a new, bloodier level. His family moved to Saigon, now Ho Chi Minh City, and his father served in the navy, then in the South Vietnamese congress. They planned to stay, even as the Viet Cong took over in April 1975.

Then his mother had a dream about falling off a cliff and being saved by the hand of the Buddha. Early that morning, his parents packed up eight of their 10 kids—two had gone to the U.S.—and rushed to Saigon's harbor, where his father commandeered a boat and chugged out to sea with 500 refugees. Pirates shot at them in the South China Sea. They ran out of fuel, and his father threatened to shoot at a Chinese tanker unless it towed his vessel to land.

The Macnguyens made it to the Philippines, then to a military camp in Arkansas, and finally to Hyde Park, New York. Curtis's father sold vacuum cleaners door-to-door. His mother worked in a factory making candy canes.

Macnguyen didn't speak a word of English when he arrived in the U.S. at the age of 6, the baby of the family. He learned it, worked at McDonald's, and spent one summer with a sister in Hawaii, picking heart-shaped anthurium flowers off the rain-soaked slopes of the Big Island for $2.17 an hour, illegally. He'd come home covered in leeches.

He worked equally hard in school, captained the tennis team, and went to the University of Pennsylvania to study engineering. A tedious summer job writing computer code in a cubicle prompted a transfer to the Wharton School, even though he knew nothing about finance. He graduated *summa cum laude* in 1990.

He worked in New York at Morgan Stanley for less than a year before landing a spot at Gleacher & Co., the investment bank founded by Eric Gleacher, who had advised Kohlberg Kravis Roberts on its record-setting, $30 billion buyout of RJR Nabisco in 1989. Gleacher paid more than other banks, and Macnguyen's salary doubled, to $100,000.

> THEN THE FEDERAL RESERVE FLOODED THE MARKET WITH MONEY, LIFTING ALMOST ALL BOATS. BUT NOT MACNGUYEN'S. HE GOT BEATEN BY INDEX FUNDS. IT JUST SHOULDN'T HAPPEN.

The place turned out to be a hedge fund incubator. At least five other analysts who worked there went on to start funds, including Larry Robbins, later the founder of Glenview Capital Management, which now has $10 billion under management. The place was perfect for a gambler like Macnguyen. "We'd play Nerf basketball for thousands of dollars," says former co-worker Raji Khabbaz, who also launched a fund. "Some of those games got pretty expensive."

The group learned about hedge funds after stock-picking legend Julian Robertson hired Gleacher to try to sell a stake in his Tiger Management. Khabbaz worked on the offering, and he and Macnguyen saw just how lucrative hedge funds could be. They pitched Gleacher on starting one in-house, but he passed, so Macnguyen bolted for Siegler Collery in 1993. "They had $80 million of assets, and that was big," he says. Einhorn, the soon-to-be founder of Greenlight, joined the firm right afterward.

Macnguyen started Ivory in 1998. He chose the name in part because, over time, he'd spent days spelling *Macnguyen* on calls, and also because, in Southeast Asia, the elephant and ivory are symbols of good fortune. In its first three years, Ivory Flagship beat the S&P 500 by 7 percentage points, 26 percentage points, and 19 percentage points, respectively.

New York began to wear on Macnguyen, and he decided to make a move he'd long contemplated, to Los Angeles, where he had often traveled for work. "Every time I got off the plane, I had the best feeling in the world," he says.

In his new suite in Brentwood, Macnguyen had healthy returns for years, in all sorts of markets. True to conservative form, he protected investors from disaster in 2008. He caught the rebound in 2009.

Then the Federal Reserve flooded the market with money, lifting almost all boats. But not Macnguyen's. Amazon rose in his face, and Hospira fell. Nothing seemed to work. He got beaten by index funds, which would be a little like Macnguyen beating Kuchar at golf. It just shouldn't happen.

The slump changed his core beliefs about his business. Before,

BLOOMBERG TIPS

Using Information Ratios to Screen Funds

You can use the Fund Screening (FSRC) function to search for funds using risk-adjusted-return criteria such as information ratio, which measures the consistency with which a fund beats a benchmark. Type **FSRC <Go>** on the Bloomberg Professional service. To search for hedge funds with information ratios of 1.25 or more, for example, first click on Fund Type, then on Hedge Fund, and finally on Update. Tab in to the field, enter *INFORMATION RATIO* and click on Information Ratio 1Y Monthly in the list of matches. Select >= Greater Than or Equal To and enter *1.25* in the field that appears. Press <Go> and click on the Results button for a list of funds. JON ASMUNDSSON

‘I’ve always felt that we’re in a no-excuse business,’ says Macnguyen.

he thought he could build a company that would outlast him. Now, that seemed impossible. If he was off his game, then the whole firm lost. No one seemed to step up.

So Macnguyen stepped back into the trenches. In Brentwood, he had allowed himself a private office. Now, he knocked out the wall that separated him from his six analysts. Everyone sits, stands, and mills around in one big room, and he hears everything the analysts say, not just what they choose to report to him in meetings. “A lot of times, it’s the thing that they don’t tell me that’s important,” Macnguyen says.

To the same end, he has software that lets everyone in the firm post ideas, no matter how harebrained, so he can see them. If the ideas pass tests for valuation, profitability, and some three dozen other factors, they get a very serious look.

'WE TRY TO FIND REALLY GOOD SETUPS,' MACNGUYEN SAYS, 'WHERE YOU HAVE TO BE A LITTLE BIT RIGHT TO MAKE A LOT OF MONEY AND A LOT WRONG TO LOSE A LITTLE BIT OF MONEY.'

Working for Macnguyen at Ivory sounds almost as tough as picking flowers in the leechy hills of Hawaii. He rides his staff hard, forcing them to defend their stock selections. “If you don’t put your ass on the line and make a high-conviction call, then you will never learn,” Macnguyen says. “You have to be so wrong, and it has to hurt so badly, and everybody has to see it, that you will never make that mistake again.”

IF ONE THING riles Macnguyen most, it’s probably the lack of respect he gets for making money with such low risk. Everyone harps on one number: return. Macnguyen believes sophisticated investors, at least, should be talking about risk-adjusted return, which can be measured by a manager’s efficiency ratio. That’s annual return divided by annual volatility. The higher the ratio, the better. Ivory Optimal’s was 1.65 as of December. That beat another hard-driving hedge funder: Bill Ackman, the top manager in *Bloomberg Markets*’ 2014 ranking of large funds. His Pershing Square International had a ratio of 1.31.

“People don’t pay attention to guys who make money on a risk-adjusted basis when the market is up,” Macnguyen says. “In the next five years, the market isn’t going to be up as much as it has been.”

With all the crowding in finance these days, one of the easiest mistakes to make is getting stuck in a “hedge fund hotel,” a stock owned mostly by other funds. They’re pricey and crowded, and guests tend to leave all at once. Just before the 2008 crash, Macnguyen saw the funds piling into energy companies and commodities producers, and he stayed clear. When the funds had to sell assets to return money to panicked investors, those stocks got whacked.

Since then, Macnguyen has honed a system for avoiding investors who aren’t in for the long haul: He looks for stocks that are mired in a trench, of sorts: 50 percent below a two-year high and within 20 percent of recent lows. Within that band, the number of shares traded must exceed all of the outstanding shares. “By then, everyone who is nervous is already gone,” he says. They’ll have been churned out. After his systems find a stock that fits, Macnguyen and his team do deep research, calling the company, visiting, and scrutinizing earnings calls.

“The perfect idea for Curtis,” says Jim Vincent, a managing director at AllianceBernstein who has been pitching ideas to Macnguyen for years, “would be a company that’s profoundly oversold and hated and has a new CEO who has a chip on his shoulder and a heavy ownership of stock that’s locked up for a long time, in a cyclical business that just troughed.”

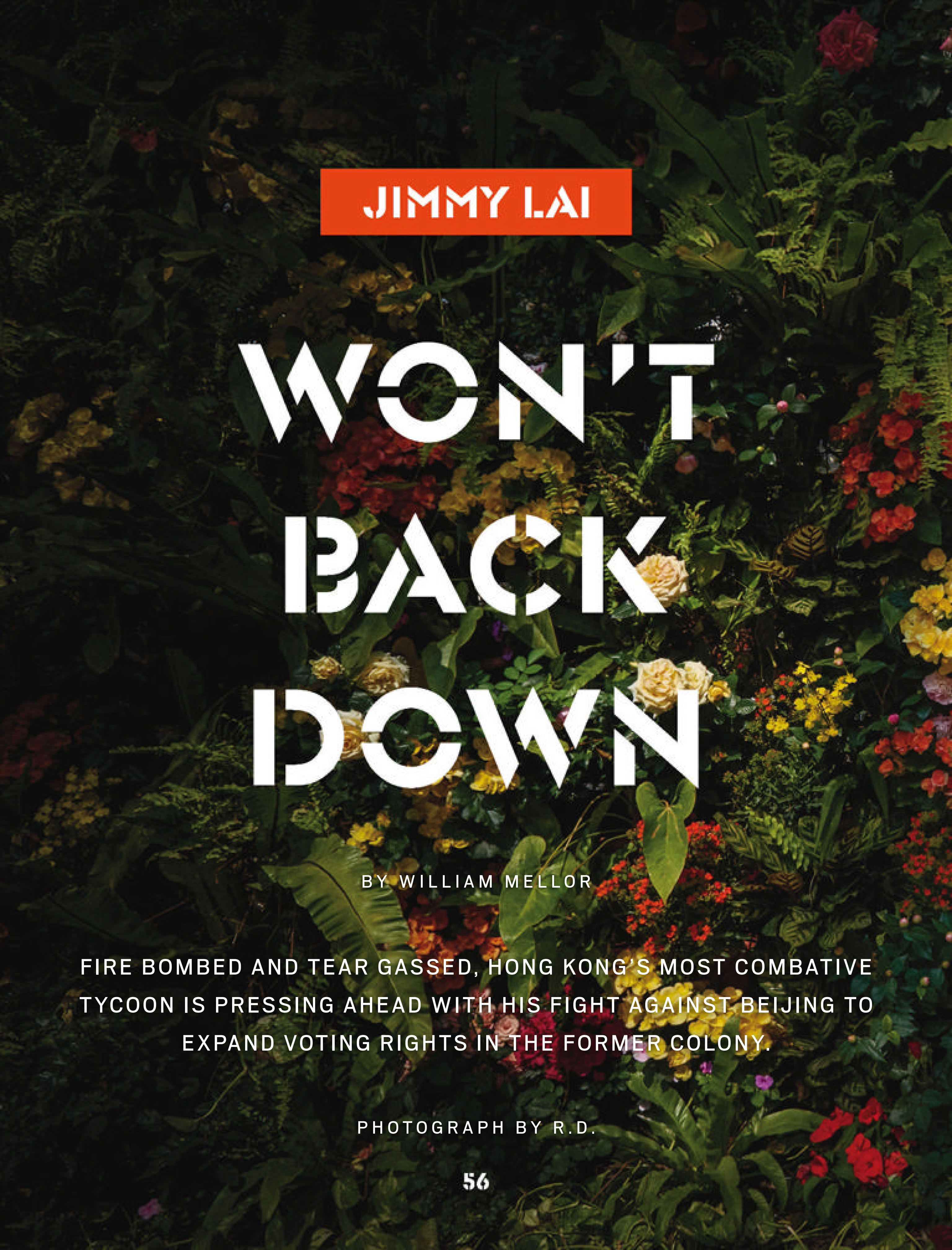
Boston Scientific met many of those criteria. It showed up on Macnguyen’s churner screen in 2012, after it had fallen below $6 from $14 back in 2008. Ivory started looking at it and learned that the company had been struggling since 2006, when the U.S. Food and Drug Administration barred it from releasing some new products until it resolved manufacturing problems. The FDA lifted the ban in 2010, but the company kept losing money. It hired a new CEO in 2011. Ivory started buying in 2012. The swooning revenue stabilized in 2013, and that was enough to lift the stock to $12 from $6. As of March 16, it traded at $17. “We try to find really good setups, where you have to be a little bit right to make a lot of money and a lot wrong to lose a little bit of money,” Macnguyen says.

Another churner find: memory chip maker Micron Technology. Macnguyen bought it at $6 in 2012. On March 16, it traded at $28, and Ivory owns 2 million shares. He points out that Einhorn backed up the truck and bought 23 million shares of Micron in 2013 and paid closer to $14.50.

The victories are adding up for Macnguyen, and he says he feels better about things than he did in the depths of his slump. Not content, by any means, but better. Ivory Optimal returned 28.3 percent in 2013, compared with 32.4 percent for the S&P 500. But the Optimal fund’s net exposure to the market—its longs minus its shorts—was just 24.3 percent. In 2014, Optimal rose 11.4 percent, lagging the market by about 2 percentage points. Its net exposure was 33 percent.

Making big money like that with limited risk isn’t easy. Nor is carrying a boulder underwater. These days, Macnguyen can go about 30 yards before he has to drop it and come up for air, probably longer if there’s money on the line. Then he goes back down and lifts it off the sandy bottom for another run.

Anthony Effinger is a senior writer at *Bloomberg Markets* in Portland. aeffinger@bloomberg.net



JIMMY LAI

WON'T BACK DOWN

BY WILLIAM MELLOR

FIRE BOMBED AND TEAR GASSED, HONG KONG'S MOST COMBATIVE TYCOON IS PRESSING AHEAD WITH HIS FIGHT AGAINST BEIJING TO EXPAND VOTING RIGHTS IN THE FORMER COLONY.

PHOTOGRAPH BY R.D.

AT 3:30 A.M. ON A CHILL JANUARY MORNING, HONG KONG MEDIA MAGNATE JIMMY LAI WAS AWAKENED BY A HOUSEMAID.

Police were at the door of his British-colonial-era mansion. "I thought they had come in the middle of the night to arrest me," Lai, a former child sweatshop worker, says matter-of-factly later that day, sipping tea in a sitting room decorated with brilliantly colored paintings by Chinese-American artist Walasse Ting.

Lai's assumption was hardly far-fetched, given his front-line role when pro-democracy protesters seized control of much of Hong Kong's central business district for almost three months late last year. On this predawn visit, however, the cops had other matters in mind. Unbeknownst to the slumbering Lai, arsonists had attacked his home, hurling a Molotov cocktail that exploded spectacularly against the steel-barred front gate. Unfazed, Lai delegated the task of meeting police to an assistant, rolled over, and went back to sleep.

Such are the life and times of Hong Kong's most combative tycoon and owner of its feistiest media outlets. And such is the fearless disdain he shows for his foes, be they China's all-powerful Communist leaders, bomb-throwing triad gangsters currying favor with Beijing, or the authors of a fake obituary published last year in a rival newspaper (to which Lai, now 66, riposted in a video, "Sorry to disappoint you").

Beginning in September, tens of thousands of protesters occupied downtown streets for 79 days. It was the biggest threat to the Chinese Politburo's control since it regained sovereignty of the former British colony in 1997. The shock troops were mainly students, but Lai's role was pivotal.

His donations have long funded pro-democracy groups. During the occupation, his tall, burly frame was an imposing presence almost every day, braving tear gas, pepper spray, and, on one occasion, pigs' entrails hurled by unidentified men. And his raucous tabloid *Apple Daily* is the loudest media voice of anti-Beijing protest. "When it comes to media influence, Rupert Murdoch is a toddler compared to Jimmy," says Robert Chow, co-founder of the pro-Beijing Silent Majority for Hong Kong. "While Murdoch tries to control things from the shadows, Jimmy is right out there. He's the brains behind it all." Martin Lee, a co-founder of the main opposition Democratic Party, says, "Jimmy Lai is indispensable to the democracy movement in Hong Kong."

Lai sees things differently. "It's a movement initiated by the people," he says. "Seeing these kids gives you great hope," he says of the student protesters. "There's no leadership, and that makes it very powerful. It is spontaneous, God-sent."

Lai and the pro-democracy movement could do with some divine intervention. Their central demand is the right to freely elect Hong Kong's leader, known as the chief executive, in 2017. Chinese President Xi Jinping is insisting on having the candidates vetted first to ensure they are pro-Beijing. The Chinese plan has to be approved by a two-thirds majority of the city's quasi-democratic legislature later this year, and minority groups financially backed by Lai may well be able to muster enough votes to block it. Should that happen, Xi's government has said the next chief executive will be selected just as the previous three were—by a Beijing-anointed committee of just 1,200 people.

The Occupy Central protesters failed to get the concessions they wanted. "They have lost in the short term, and that's unfortunate," says Douglas Paal, a vice president of the Washington-based Carnegie Endowment for International Peace and a former adviser on Asia to U.S. President George H.W. Bush.

However, shock waves from the occupation continue to reverberate around Zhongnanhai, the walled compound abutting Beijing's Forbidden City where Xi is establishing himself as China's most powerful leader since Mao Zedong. By crushing democratic aspirations, Xi could endanger Hong Kong's role as China's international financial center—a position it holds in large part because of its existing freedoms,

DEFYING THE ODDS

1948 Jimmy Lai is born in China months before Mao Zedong proclaims the People's Republic.

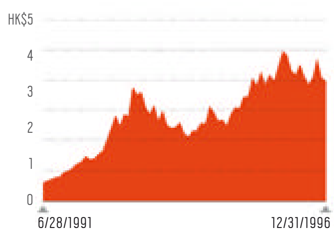
1960 Lai, 12, is smuggled penniless into Hong Kong. He works and sleeps in a sweatshop.

1981 Lai founds the Giordano fashion chain, named after a New York pizzeria.

1989 The Tiananmen Square crackdown politicizes Lai, who later launches *Next* magazine.

1994–1996 Lai insults China's premier. Beijing starts closing Giordano stores. Lai sells all his shares.

GIORDANO STOCK PRICE



Source: Bloomberg

says Kerry Brown, head of the University of Sydney's China Studies Center. "Hong Kong is still incredibly important as the primary portal for capital flows in and out of China," Brown, a former senior British diplomat, says. "Beijing may have won in the short term, but in the long term it cannot win if it wants to preserve Hong Kong as the distinctive place it is."

In a city that can seem all-business and money obsessed, Lai has helped to politicize an emerging generation of Hong Kong's brightest and push them to challenge Beijing's idea of democracy. "The young people in Hong Kong have a very different value system, and they are prepared to fight for it," he says. "Democracy, freedom of information is like air to them. If they can't have it, they can't breathe."

Many in the business community agree. "Hong Kong's core values are absolutely critical to its success," says Peter Levesque, chairman of the American Chamber of Commerce in Hong Kong. "This is a defining moment. Is Hong Kong committed to maintaining the characteristics that have made it so successful? Or is it destined to become just any other city in China?"

Hong Kong police officers detain **Lai** during raucous street protests in December.

LAM YIK FEI/BLOOMBERG

The struggle for Hong Kong's future is being closely watched by foreign investors whose enthusiasm for Hong Kong shares has made the $4.25 trillion stock exchange the world's fourth largest by market value. While the stock market lost only 1.6 percent during the protest compared with a 3.4 percent decline in the MSCI World Index, the broader economy took a hit. Growth slowed to 0.4 percent in the fourth quarter from 1.4 percent in the previous three months.

The protests aren't going away, says David Webb, a Hong Kong–based investor and shareholder activist who supported them. "The government will have to expect, so long as it lacks legitimacy, to face more challenges to its authority and possibly more-organized ones," he says.

While Hong Kong was never a democracy under Britain, it did enjoy free speech and an independent legal system. Under an agreement known as "one country, two systems," China guaranteed those freedoms would be retained for 50 years from 1997, when the colony returned to Chinese sovereignty. Eighteen years later, some appear under threat—in part because of efforts to muzzle Lai. While successive Chinese governments have left the former colony's legal system intact, Hong Kong plunged from 12th place in 2002 to 61st in 2014 on the World Press Freedom Index of 180 countries compiled by Paris-based Reporters Without Borders.

Lai and his allies are riding a wave of protest that isn't only about freedom. Hong Kong (population: 7.2 million) is one of the world's most unequal societies. Ten of the world's 200 wealthiest individuals live within the 1,104-square-kilometer (426-square-mile) enclave, according to the Bloomberg Billionaires Index. In a city that has more Rolls-Royces per capita than any other, multibillionaires live practically cheek by jowl with old people who live in cages—bunks stacked on top of one another in tenement rooms, separated only by metal bars. Government figures show that one in five Hong Kongers lives in poverty and half earn less than $1,700 a month in a city with the world's highest property prices.

Hong Kong's economic and political elites have a cozy relationship with the leadership on the mainland. On the eve of the protests, President Xi called on the city's most powerful business figures to do their patriotic duty and pledge their

solidarity with Beijing. Lai wasn't invited; he hasn't been allowed to enter mainland China since 1993. But about 40 others, including Asia's richest person, Li Ka-shing, piled into private jets and flew to Beijing to take part in a photo op with Xi in the Great Hall of the People. "In Hong Kong, there is a very ugly alliance between the Communists and the rich people," says Cardinal Joseph Zen Ze-kiun, a former head of the Catholic Church in Hong Kong.

Lai's personal story exemplifies the wealth gap. He has amassed a $900 million fortune, according to Mark Simon, a U.S.-born aide who handles his finances. And the garden suburb in which he, his wife, Teresa, and the youngest of his six children live with their pet golden retriever is a stone's throw from teeming Mongkok, the neighborhood with one of the highest concentrations of cage dwellers. Lai, who also has a similar family home complete with matching retriever in Taiwan, is unapologetic about his fortune. Of income inequality, he says: "It is happening everywhere where there's an economic transition." Lai is also not in agreement with many fellow democracy activists who believe the system is now so weighted against the poor that it's impossible to replicate the rags-to-riches path taken by Li Ka-shing and other older tycoons, including himself. Citing better education possibilities, Lai says, "The opportunity actually is more now than when I was young."

Lai was born amid civil war and starvation in Guangdong province, just across the border from Hong Kong. At the age of 12, he arrived in the British colony in 1960, hidden in the bottom of a smuggler's boat. "I had no money, but the smuggler took me to my mother's sister and she paid him," Lai says. "A few hours later, I was taken to a factory." It was a garment sweatshop, and Lai slept on the premises. He was paid $8.50 a month. "It was like heaven," he says. "All of a sudden, there was hope."

In 1966, Mao plunged China into the turmoil of the Cultural Revolution, and the following year, deadly rioting spread across the border, with Maoists battling British colonial police. Equity and property markets crashed. Lai, who had been promoted to better-paying jobs, bet on beaten-down stocks. The benchmark Hang Seng Index surged 2,900 percent in six years. Lai says he and a friend turned a $2,000 bet into $150,000, which they used to buy a textile factory.

In 1981, Lai launched a fashion retail chain, naming it Giordano after a New York pizza restaurant he had eaten in while visiting the factory's U.S. customers. By then, Lai had taught himself English, a language he now commands well enough to devour the cerebral works of a favorite author, the 20th-century English poet and philosopher Owen Barfield.

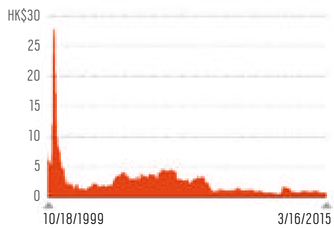
Lai's politicization came in 1989, when China's military sent tanks into Tiananmen Square. "My heart opened up," he says. Lai began producing T-shirts lauding the doomed pro-democracy students of Tiananmen. Then, in 1990, he launched *Next* magazine, a weekly combining sex and crime with hard-hitting anti-Beijing rhetoric. In one 1994 issue, Lai called China's then premier, Li Peng, a "turtle's egg," Chinese slang for "bastard."

Within a month, Chinese authorities started closing down his stores, which had expanded into the mainland. Lai says he had no option but to sell his entire 37 percent shareholding for $280 million. Today, Giordano International, a publicly listed company, has grown to 2,600 stores in 30 countries. Lai shrugs off the loss. "The most important thing is I did what I believed in," he says. Having lost one business empire, Lai proceeded to build another, Next Media. In 1995, he launched *Apple Daily*, with a layout like *USA Today*'s and news content similar to Murdoch's *New York Post*. Sales soared.

As the 1997 handover approached, many pro-democracy activists feared they would be jailed. The thought crossed Lai's mind. Never a particularly devout man, he says the uncertainty of those times, together with the influence of his deeply religious wife, may have prompted him to embrace Catholicism. Lai was baptized by Cardinal Zen in 1997.

In 2003, Hong Kong's then chief executive, Tung Chee-hwa, attempted to impose anti-subversion laws. Urged on by Lai's publications, some 500,000 people took to the streets in protest. Tung backed off and two years later resigned. Similarly, in 2012, when current Chief Executive Leung Chun-ying

NEXT MEDIA STOCK PRICE



Source: Bloomberg

DRIVING PROTESTS

1997 China regains sovereignty over Hong Kong. Lai fails to find an investment bank willing to underwrite an initial public offering.

1999 Lai lists Next Media through a reverse takeover. The stock peaks at HK$27.25 the following year.

2003 Urged on by Lai's publications, 500,000 Hong Kongers march to thwart proposed security laws.

2012 Lai backs another successful protest, which blocks the introduction of mainland-style education. Next Media shares bottom at 45 cents.

2014 Lai is on the front line when protesters occupy central Hong Kong for 79 days.

In October, bundles of Lai's ***Apple Daily*** sit ready for distribution at the company's printing plant.

LAM YIK FEI/BLOOMBERG

tried to introduce elements of the Chinese education system into schools, Lai again sided with tens of thousands of students who besieged government headquarters for 10 days. Once more, the government backtracked.

Will that happen again? Michael DeGolyer, a U.S.-born political science professor at Hong Kong Baptist University, says public opinion will pay a crucial role in answering that question. When the protesters first took to the streets, they attracted a wave of sympathy following the heavy-handed police response. Occupy Central was romantically rebranded the Umbrella Revolution after the rain gear protesters used to fend off tear gas. And student activists such as baby-faced Joshua Wong, who turned 18 on the barricades, became heroes overnight.

However, public support eventually turned to anger at the inconvenience and financial losses caused by the disruption. The fragmented protest leadership, which also included academics and opposition politicians, bickered. After six weeks, polls showed 64 percent of people wanted the government to clear the protest sites, which a month later it did. Now, November local government elections loom large. "It will be a key test," says DeGolyer. "If the democrats get less than 50 percent of the vote, they will lose a lot of credibility."

To some in Hong Kong, Lai has a credibility problem of his own. Last year, when newspapers published details of donations Lai had made to pro-democracy groups and politicians, the city's Independent Commission Against Corruption began an investigation. The ICAC said in August that it began its probe after receiving complaints that some lawmakers had received inducements in breach of the Prevention of Bribery Ordinance. The commission has since declined to make any further comment. Lai, who says his financial records were stolen by hackers, confirms he made the donations, but says they were legal. "I am not worried," he says. "If they put me in the prison, my conscience is not in the prison."

Pro-Beijing media delight in painting Lai as a stooge of the U.S. government. WikiLeaks cables made public in 2011 showed that U.S. diplomats had met with Lai and other pro-democracy activists, prompting the official *China Daily* to brand Lai and three others The Gang of Four, a term of deep opprobrium in China that was originally applied to Mao's last wife, Jiang Qing, and three associates blamed for the worst excesses of the Cultural Revolution.

Lai says that although he can handle the dirt thrown at him, he won't ask any of his children to succeed him at the helm of Next Media. They range in age from 8 to 38; three are in school, and the other three have businesses of their own. "I came from the streets and have been a fighter all my life," Lai says. "They have always lived a comfortable life. How can I expect them to start where I finished?"

So far, Lai has survived China's attempts to silence him. "It comforts me that Jimmy is there," says Victor Shih, a Hong Kong–born Harvard Ph.D. and China scholar at the University of California at San Diego. If Lai were somehow sidelined, that would be a sign that the status Hong Kong enjoys under "one country, two systems" is doomed, Shih says: "He's the canary in the coal mine."

William Mellor is a senior writer at *Bloomberg Markets* in Sydney. wmellor@bloomberg.net
With assistance from **Natasha Khan** in Hong Kong.

On the eve of last year's demonstrations, Chinese President **Xi Jinping**, far right, summoned Hong Kong billionaires—including Asia's richest man, **Li Ka-shing**, third from right—to Beijing.

JOYCE NG/SCMP

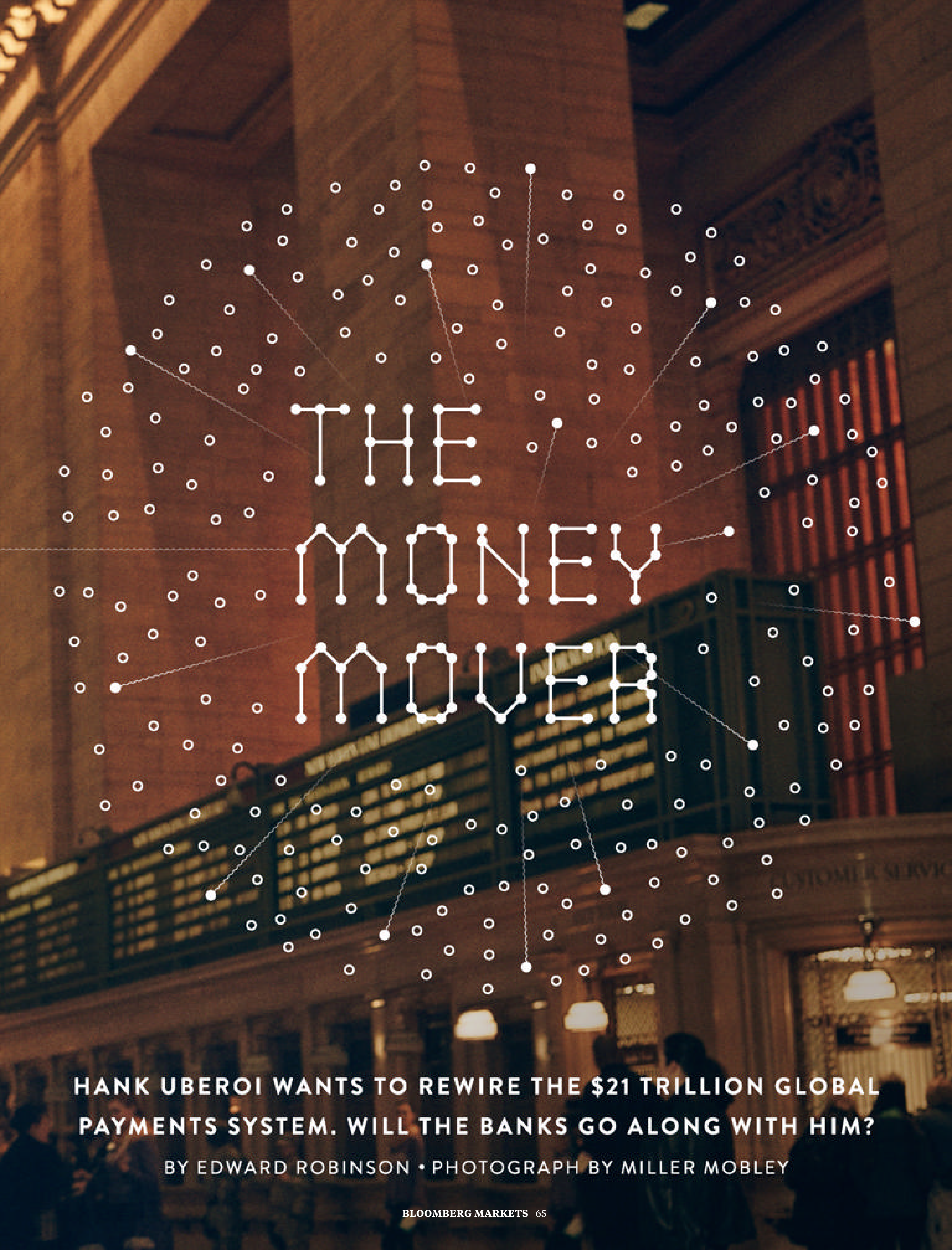
IN 1994, LAI BRAZENLY CALLED CHINA'S THEN PREMIER, LI PENG, A 'TURTLE'S EGG,' CHINESE SLANG FOR 'BASTARD.'

BLOOMBERG TIPS

Evaluating Hong Kong's Risks

You can use a Bloomberg spreadsheet template to assess Hong Kong's country risks in comparison with those of other markets. To download the sheet, type **XLTP <Go>** on the Bloomberg Professional service. Tab in to the SEARCH field, enter *COUNTRY RISK*, and press <Go>. Click on the Open button under the description of the Country Risk Assessment spreadsheet. In the spreadsheet, click on the cell to the right of Country Selection. Then, click on the arrow that appears and select Hong Kong in the list. Click on the Risk Score Analysis–Relative tab. As of December 2014, Hong Kong ranked No. 1 overall (i.e., lowest risk) and No. 4 in political risk. JON ASMUNDSSON


Evaluate deal risk
with the
Interactive Deal Tool
Available on multiborrower
U.S. CMBS presales



THE MONEY MOVER

HANK UBEROI WANTS TO REWIRE THE $21 TRILLION GLOBAL PAYMENTS SYSTEM. WILL THE BANKS GO ALONG WITH HIM?

BY EDWARD ROBINSON • PHOTOGRAPH BY MILLER MOBLEY

When Hank Uberoi

said goodbye to a long and lucrative career on Wall Street in 2004, he could have retired to a life of investing in ventures he loved and tending his 20,000-bottle wine collection. Instead, he's working late nights and winging from continent to continent in a bid to transform one of the most vital functions in the world economy: the movement of money from one country to another.

Uberoi, 54, a former head of Goldman Sachs's global technology systems, admits his quest is half-crazy. For almost four decades, the crossborder payments system has been controlled by SWIFT, shorthand for the Society for Worldwide Interbank Financial Telecommunication, a nonprofit cooperative of 10,800 banks. Uberoi is the CEO and top individual stockholder of Earthport, a London-based company that's built a cloud-based alternative payments network. It recorded only $11 million in sales—and zero profit—in its last fiscal year.

And yet Uberoi is betting that his tiny enterprise can rewire a machine that circulates about $21 trillion annually to every corner of the globe. "At first I felt like I was suffering from temporary insanity, but in a 30-year career, I've never seen an opportunity this large," says Uberoi, a speed-talking plug of a man who's so busy these days he doesn't even bother to keep a desk.

Uberoi says big banks have done little to reboot an international payments system that's as outdated as eight-track tapes. Today, money moves around the world through a network of thousands of correspondent banks in which a single crossborder payment can ricochet through as many as five different banks. Each one takes a bite out of the transfer in fees or from exchanging currencies, and each decides how and when to transmit the money along the way.

'WE SAW A NEED TO CREATE A FEDEX FOR MONEY, BUT IT WAS GOING TO BE DIFFICULT,' SAYS UBEROI.

SWIFT, founded in 1973, is responsible for bringing order to this process, but it suffers from a fundamental flaw. It acts like an air-traffic controller for overseas transactions. It directs them to their destinations but doesn't actually move money. SWIFT is just a messaging system that banks use to tell each other where to send cash. This decentralized approach is fraught with inefficiencies such as misdirected transfers and delays. "It's an absolute mess," says Erin McCune, a consultant at Glenbrook Partners, a firm in Menlo Park, California, that analyzes the global payments industry.

Even so, it constitutes the global economy's financial bloodstream. Multinationals such as Airbus and General Electric send trillions through the correspondent banking system every day to their suppliers around the world. Migrant workers use it to wire money home to their families. This cash flow grows every year: Crossborder e-commerce alone is projected to triple to $900 billion in 2020, and remittances are now a $500 billion annual business, according to the World Bank.

"It's ironic that we can send a physical package from one part of the world to another faster, cheaper, and with more transparency than money," Uberoi says over a curry lunch at an Indian eatery next door to Earthport's offices in the City of London. "We saw a need to create a FedEx for money," he continues, "but it was going to be difficult. Banks are highly regulated, they are risk averse, and moving money is a mission-critical function for them. We came to market offering a solution in 2011, and banks looked at it and said, 'You're crazy! Here you are, this money-losing company, telling me I can do payments differently? Forget it!'"

Uberoi didn't forget it, and four years later, his persistence is paying off. Bank of America, the World Bank, HSBC, Standard Chartered, Banco do Brasil, Western Union, and even SWIFT itself are among the institutions that have tapped Earthport to help them deliver their clients' cash to more than 60 countries in 120 currencies. Shares in Earthport, which charges banks transaction fees, soared 89 percent in the 24 months ended on March 16, closing at 42 pence. Its market is growing: Worldwide revenues from processing crossborder payments have been climbing at an 11 percent annual clip since 2010 and will hit $77.4 billion in 2020, according to a forecast by Boston Consulting Group.

There was a time when investors couldn't have cared less about the inner workings of the global payments infrastructure. Suddenly, this arcane business has become one of the hottest spaces in fintech, the surge in digital innovation that's thrown banking into flux.

The cloud-based connectivity of the Web is ideally suited to blowing away the inefficiencies of the aging correspondent banking system, says Jan Hammer, a partner at Index Ventures in London. Players such as PayPal, Visa, and MasterCard are racing to leapfrog the old model. In December, Adyen, an Amsterdam-based company that processes international payments for Facebook and Airbnb in lieu of banks, raised $250 million in venture funding from Index and other investors. "It's plumbing, but the payments market has opened up, and its size could not be larger," Hammer says.

COURTESY OF BANK OF AMERICA

Wim Raymaekers, SWIFT's head of banking, says that the time has come for fundamental change. He says the organization, which operates a software and design lab at its headquarters near Brussels, is taking steps to improve efficiency. In Australia, SWIFT is working with local banks on a A$1 billion ($774 million) project to enable customers to send and receive domestic payments instantaneously. "Globalization has put pressure on the traditional model, and wire transfers don't meet all the needs anymore," Raymaekers says.

Uberoi has elbowed his way into this market by making nice with the banks, not bypassing them. Having learned the culture of global finance at Goldman, he says, he knew there was scant chance the industry, with SWIFT in existence, would ever muster the consensus to replace correspondent banking with a more efficient system. So he decided to do it for them.

"Hank put himself squarely in the middle of that problem and said, 'Look, I'll build the connection, and the more banks that participate, the lower the cost,'" says Ather Williams, who moves $1 trillion a day as the head of global payments at Bank of America Merrill Lynch. "And our clients really don't care whose network I'm using as long as I guarantee the payment is going to get there."

'OUR CLIENTS REALLY DON'T CARE WHOSE NETWORK I'M USING AS LONG AS THE PAYMENT IS GOING TO GET THERE,' SAYS BANK OF AMERICA'S WILLIAMS.

Uberoi has won over **Ather Williams**, global payments head at Bank of America Merrill Lynch.

Still, Earthport's momentum could fizzle if its banking partners fail to pump serious transaction volume through its system. The firm faces a crucial test as it sets out to grow its top line—"exponentially," Uberoi says—over the next 36 months. "It's very hard for Earthport to forecast when these tie-ups are going to start producing revenue and how quickly they'll ramp up," says Rob Giles, a senior portfolio manager at Henderson Global Investors, which holds a 7.7 percent stake in the firm's shares. "But if Earthport can build the pipes that run the banks' crossborder payments, then it's going to be one of the winners in this space."

For a tech geek, Uberoi, who splits his time between London and his family home in Montclair, New Jersey, exudes the hustle of a salesman. He peppers his conversation with biz school lingo—a deal is a "win-win-win," an obstacle is a "pain point." In February, he joined a delegation of business executives that accompanied U.S. President Barack Obama to India. Uberoi took a side trip to pitch Indian banking officials on the idea of using Earthport as a nationwide payments connection to outside markets. "It's a long shot, but we have to go after large pools of transactions," he says.

TAKING BIG CHANCES is right in character for Uberoi. He was born in India, the son of an army officer. At the age of 17, he heard two wealthy classmates chatting about enrolling in American universities. Curious, he sent off some applications and received a scholarship from Williams College, a highly selective liberal arts school in Massachusetts, where he studied computer science and physics.

Following his 1985 graduation, Uberoi was set to pursue a Ph.D. in computer science when he met a Morgan Stanley recruiter at a job fair. The era of computerized trading was dawning on the Street, and the investment bank was hunting for tech guys.

Uberoi spent three years at Morgan Stanley before jumping to Goldman in 1988. The firm dispatched him to Tokyo to help build a business in Japanese equity warrants. As he worked with traders to install systems so the desk could sell, trade, and make markets in the securities, he was immersed in the engineering that undergirds the capital markets.

By 1998, Uberoi was back in New York as co–chief operating officer of the firm's global tech operations and on his way to becoming a partner. He joined Kenneth Griffin's Citadel hedge fund firm as COO in 2002 and ran its long-short desk, legal compliance, and risk management units, even its human resources department. Uberoi was unwilling to move his family from New Jersey to Citadel's home base in Chicago, so he quit two years later and, with "several tens of millions of dollars" of his own cash, formed HU Investments, an angel fund.

In 2008, he heard about a company with a sci-fi name that was trying to create an alternative international payments network. Earthport was co-founded by two entrepreneurs in London in 1997 as a website that processed payments for lottery tickets issued by the fundraising arm of the British Red Cross. It went public in 2001 in London. By the time Uberoi came along, Earthport had built an e-wallet that enabled users to make international credit card and cash transactions through its website. As Earthport announced deals with money transfer firms in Latin

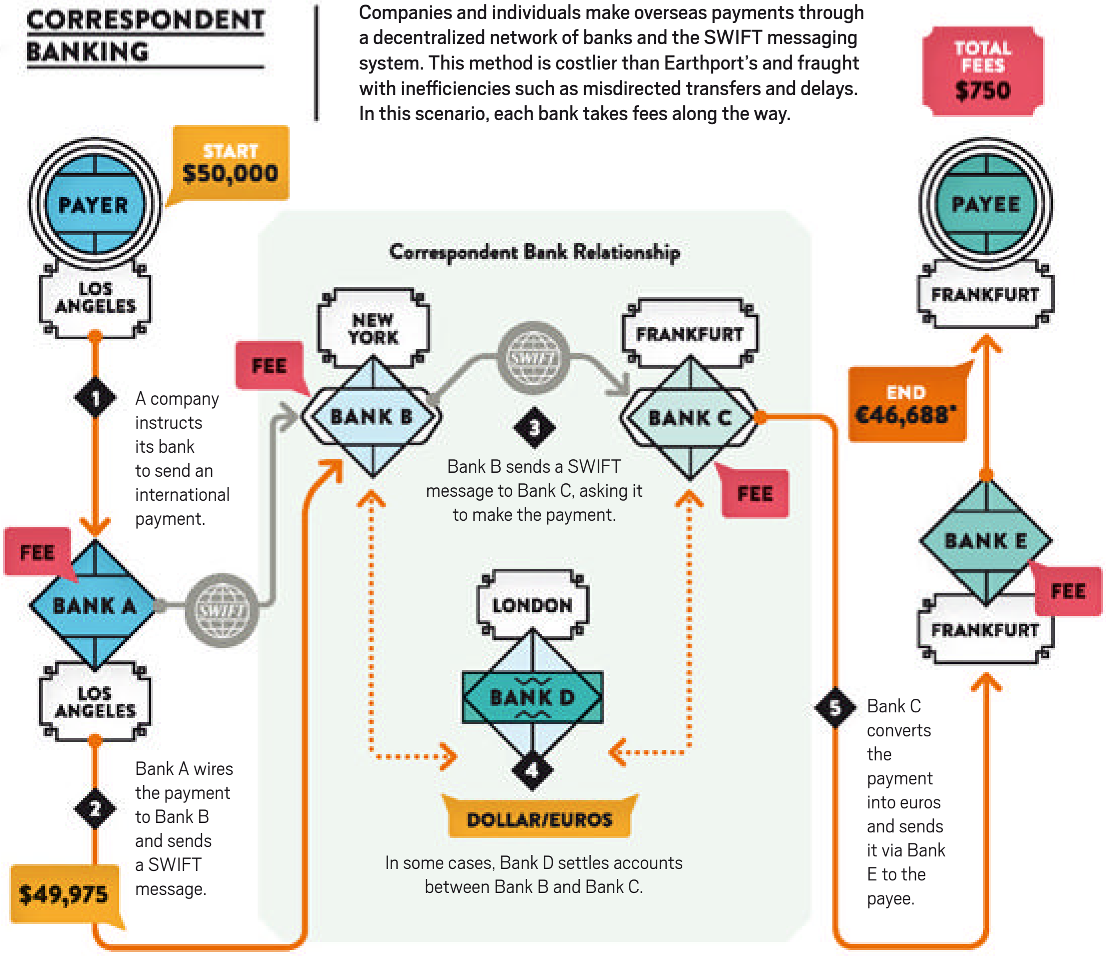
NETWORKING

Built in the 1970s, the current method for making overseas payments is ill-equipped for a digitized global economy. New ventures like Earthport are rewiring a machine that circulates about $21 trillion a year.

**Currency conversion on March 16 at €0.95 to the dollar. Sources: Bloomberg, Earthport, Glenbrook Partners*

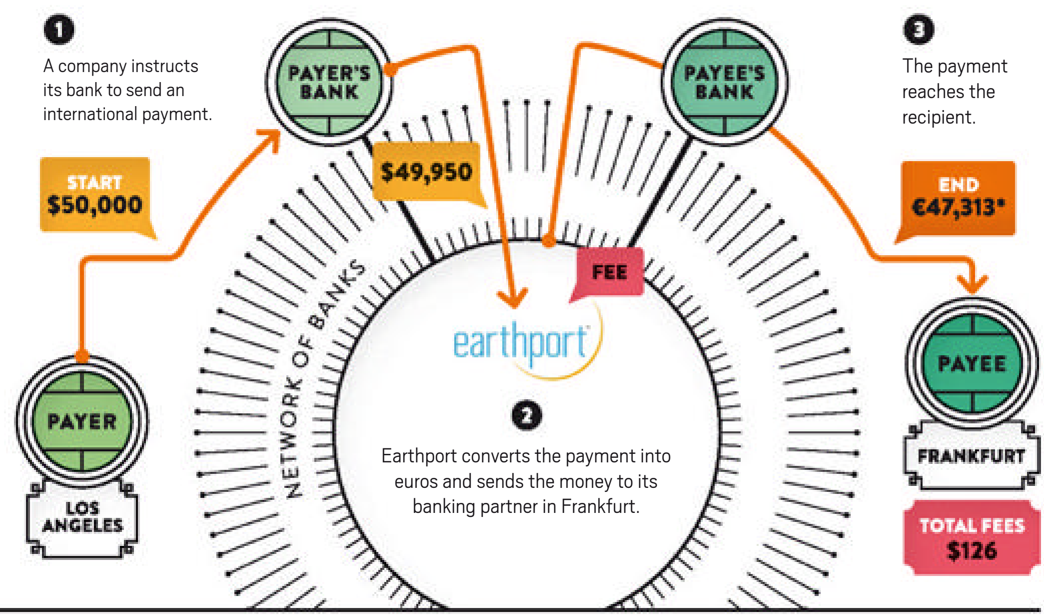
CORRESPONDENT BANKING

Companies and individuals make overseas payments through a decentralized network of banks and the SWIFT messaging system. This method is costlier than Earthport's and fraught with inefficiencies such as misdirected transfers and delays. In this scenario, each bank takes fees along the way.



EARTHPORT

Earthport has built a crossborder interbank payments hub as an alternative to the old model. Clients can move and track transfers through the firm's centralized network of more than 60 banks.



America and the Middle East to extend its reach, its stock jumped 205 percent from June 30, 2007, to June 30, 2008. Bullish on Earthport's prospects, Uberoi amassed $5 million worth of the company's shares on London's AIM exchange.

By late 2009, Earthport's fortunes were cratering as it failed to convert its grand strategy into actual sales, says Henderson's Giles, who at that time was shorting the company's shares. Losses piled up, and Earthport's market value plunged 75 percent. "Management was very good at promoting the company, but when you looked under the bonnet, there wasn't a lot there," says Giles, who reaped an 85 percent return for his clients by betting against Earthport that year.

Uberoi hadn't been as prescient. "It was embarrassing; I felt hoodwinked," he says. "But I still liked the concept." So in February 2010, Uberoi took the helm as the company's executive director. He declined a salary, retired the company debt of £1 million ($1.5 million), and recapitalized Earthport by selling £11 million in new shares. Then, he started designing a turnaround plan. "I thought it would take six to 12 months," he says.

Five years later, Uberoi is CEO, and Earthport's hub-and-spoke model is a viable alternative to the existing order. When

BLOOMBERG TIPS

Mapping Earthport

You can use the Relationship Map (RMAP) function to get an overview of Earthport. Type **EPO LN <Equity> RMAP <Go>** on the Bloomberg Professional service. For more detail on the analysts following the company, click on the plus sign in the center of the Analysts node. As of late March, all three analysts had buy ratings on Earthport. Click on the minus sign to return. For information on the company's financials, click on the Balance Sheet heading to display a chart of the company's balance sheet in the Financial Analysis (FA) function. To find other companies that compete in financial-transaction-processing services, type **CCB <Go>** for the Company Classification Browser function. JON ASMUNDSSON

COURTESY OF SWIFT

SWIFT, whose **headquarters** is in La Hulpe, Belgium, is owned by member banks.

'GLOBALIZATION HAS PUT PRESSURE ON THE TRADITIONAL MODEL,' SAYS WIM RAYMAEKERS, HEAD OF BANKING AT SWIFT.

a crossborder payment begins its journey in this scheme, a bank hands it off to Earthport, which delivers the money to its destination for less than $5. By comparison, wire transfers between correspondent banks cost from $5 on average to more than $50, plus 0.25 to 3 percent charges for handling the foreign-exchange conversion and landing fees ranging up to $20. Earthport will also provide foreign-exchange trading and, for an extra fee, "pre-position" money in markets where clients send regular transactions. The firm can track the payment throughout its journey. It says its error rate on transfers is 0.1 percent, compared with a 4 percent average under existing methods.

Now, Earthport must demonstrate to investors that banks will indeed move billions of dollars through its shiny new network. It's off to a good start. The firm's sales vaulted 172 percent during the second half of 2014. Uberoi must continue to win over customers. Banks are hesitant to entrust outside firms with their clients' cash, and it can take them one to two years of due diligence to reach a deal, Uberoi says. Moreover, should SWIFT or the banks move to replicate Uberoi's model, that could also hamper Earthport's growth prospects.

THESE CHALLENGES ARE very much on Uberoi's mind as he takes the floor to address Earthport's 185 employees in an all-hands meeting on a crisp London February afternoon. "When we first started off, it was an idea. Then we learned the hard way over the next two years that the product needed a lot of work," Uberoi says. "But now we have established credibility with our banking partners, and with ourselves. Now, we have to ask, 'How do we exponentially accelerate our growth?' We are at a turning point. That's the good news. The other good news? If you thought we were working hard, well, we're going to be working even harder. We're not going after one client in one geography. We want to go after 30. We want to go after 50."

Uberoi is raring to go. He has $7 million of his own cash and years of toil invested in this company. As he dashes for a crossborder payments confab across town, he can't hide his grin. For five years, he's been waiting for this moment. He and his team have built their machine. Now, it just needs to kick into gear.

Edward Robinson is a senior writer at *Bloomberg Markets* in London. edrobinson@bloomberg.net

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THE K-BEAUTY

KING

Harnessing his country's cultural momentum, Korean billionaire Suh Kyung Bae has turned his family's cosmetics company into a Pan-Asian powerhouse—and a favorite of investors.

BY **YOOLIM LEE**, **LIZA LIN**, AND **ROSE KIM**

THE K-BEAUTY KING

BACK IN THE 1930s, YUN DOK JEONG'S ability to provide for her six children came down to the camellia plant.

To extract its prized oil—which fashionable Korean women used in their hair—Yun would spend hours pulverizing and pressing the flowers' delicate seeds in the kitchen of her home in Gaeseong, a center of commerce—now part of North Korea—that was best known for merchants who pioneered the cultivation and trading of ginseng.

More than eight decades later, Yun's grandson Suh Kyung Bae has turned those humble beginnings into one of Asia's most powerful cosmetics empires. "The root of Amorepacific is my grandmother," says Suh, seated in front of a replica of her original kitchen inside his company's museum in Osan, South Korea. The aromas of camellia, ginseng, and other Asian plants greet visitors in the all-white showroom, part of the company's sprawling 22-hectare (55-acre) campus, which includes a bustling factory churning out 15,000 metric tons of cosmetics a year, as well as an art museum and botanical garden. About 50 kilometers (30 miles) away, in central Seoul, construction crews are building a new $470 million headquarters designed by British architect David Chipperfield that's scheduled to open in 2017.

Under Suh, Amorepacific has blossomed into the world's 11th-largest skin-care-products maker by market share, according to Euromonitor International. In 2014, Amorepacific Group's net income climbed 36 percent to a record 222.4 billion won ($197 million), with total sales rising 21 percent to a record 4.7 trillion won, a sevenfold increase from 1997, when Suh took over from his father, Suh Sung Whan. Among Asian firms, only the Japanese companies Shiseido and Kao produce bigger numbers in Asia—and Amorepacific has rapidly narrowed the gap in the past decade, thanks in part to its success in China, where sales have grown at an annual average rate of 47 percent since 2002. "Our goal is to become a great global brand company," says Suh, who aims to more than double revenue to 12 trillion won during the next five years.

At 52, Suh has few lines on his face and credits his youthful skin to the quality of his products—all of which, including those designed for women, he tests and many of which he wears daily. (He says he doesn't try out the mascara because it's difficult to apply.) Suh and Amorepacific defy many of the clichés associated with Korea's large family-owned businesses, or *chaebol*. Investors have blamed their complex ownership structures, with interests in myriad unrelated industries, as a reason why some Korean stocks trade at lower price multiples than those of their global peers, a phenomenon known as the Korea discount.

Amorepacific began in **Yun Dok Jeong**'s kitchen. Her son **Suh Sung Whan**, at left, took the company public.

PREVIOUS SPREAD AND THIS PAGE: COURTESY OF AMOREPACIFIC

Amorepacific is the antithesis of that. Suh owns 56 percent of Amorepacific Group, the holding company, which has 10 units involved in the health and beauty business. The anchor of the group is Amorepacific Corp., the cosmetics maker, in which Suh owns 11 percent, in addition to shares he owns through the holding group. Both stocks have been a hit among investors. In the 12 months through March 17, shares of Amorepacific Group surged 159 percent to 1,267,000 won, compared with a 5.3 percent gain in the benchmark Kospi Index. Shares of Amorepacific Corp. climbed 162 percent to a record 3,123,000 won over that same period. In the process, Suh has become Korea's third-richest person, with a net worth of $6.7 billion as of March 17, according to the Bloomberg Billionaires Index.

"When it comes to corporate governance and transparency, Amorepacific stands out," says Park Ju Gun, president of corporate watchdog CEO Score in Seoul. "This kind of diligent devotion to one field is difficult to come across in most of South Korea's large businesses."

While Amorepacific has a strong understanding of Asian customers, Suh faces some challenges as he pursues his global vision. For one, the company has struggled to crack the European market, which accounted for just 2.4 percent of Amorepacific Corp.'s total sales in 2013. "It would be great if the company could do well in Europe, but that appears to be challenging so far," says Heo Pil Seok, CEO of Midas International Asset Management in Seoul, who

Amorepacific and its chairman, **Suh Kyung Bae**, defy many of the clichés associated with Korea's *chaebol*.

counts Amorepacific shares among the $10 billion he helps manage.

Suh also faces new competition at home, including the online startup Memebox, which sells rival Korean beauty products at competitive prices. In March, the company announced that it had raised $29 million from investors such as venture capital firm Formation 8 and would expand its e-commerce efforts in China and the U.S.

Amorepacific's 70-year journey parallels the turbulent history of Korea itself. The Koreans were under Japanese rule when Yun Dok Jeong began making hair oil in her Gaeseong kitchen in 1932; her second son, Sung Whan, who ran all her errands, was conscripted into the Japanese military and served in China. Soon after returning home in 1946, he took over the business and adopted the company name Taepyungyang, meaning *Pacific Ocean* in Korean. When the Korean War broke out in 1950, the family hid in an underground tunnel in Gaeseong for several months before escaping to the southern port city of Busan via cargo train. There, Sung Whan restarted the business. Gaeseong merchants were known for trading on trust; between them, handshakes typically sealed deals. In the south, Sung Whan found suppliers who provided materials on credit, and he paid his employees with food.

In 1952, money began pouring in with the company's introduction of ABC Pomade for men, which became a bestseller. But women remained Sung Whan's focus. When the company began door-to-door sales in 1964, its primary recruitment target was mothers who had lost their husbands during the Korean War. In turn, 40,000 "Amore Ladies," as they were then known, helped increase sales sevenfold by 1970. (The company's first intern, Oh Won-Shik, who went on to become vice president, suggested the name Amore after listening to a popular Italian song. The company officially changed its name to Amorepacific in 2002.)

Buoyed by robust sales, the company went public in 1973. Suh, the second-oldest son of Sung Whan, earned an MBA from Cornell University and joined the company in 1987, working in sales and finance divisions and building a factory from the ground up. While cosmetics remained the elder Suh's passion, he decided to branch out into different industries, fearing that the anticipated opening of the domestic market to global beauty brands would

PHOTOGRAPH BY **JAE-HYUN KIM**

A BEAUTIFUL THING

Of the 15 largest cosmetics companies by market value, Amorepacific ranks as the biggest mover over the 12 months through mid-March, with a 161 percent gain.

Company	Return*
Amorepacific	161.1%
Kose	109.1
Kao	78.7
Pola Orbis	71.0
Coty	50.1
L'Oréal	48.4
Fancl	38.5
Revlon	35.9
Shiseido	26.1
Estée Lauder	17.1
Inter Parfums	-12.1%
Oriflame Cosmetics	-23.0
Natura Cosméticos	-29.6
Elizabeth Arden	-45.3
Avon Products	-50.7

**March 16, 2014, to March 16, 2015. Source: Bloomberg Intelligence Global Cosmetics Valuation Peers Index*

threaten his company. Yet by the early 1990s, the business had swelled into a debt-ridden, midsize *chaebol* with interests in everything from construction to stockbrokerage.

Following a bitter labor strike that paralyzed production for almost two months in 1992, the company ran out of products to sell and cash to meet its debts. To avert bankruptcy, the younger Suh—who was now effectively running the firm because of his father's failing health—decided to radically transform the business.

"I thought very hard, 'What is it that I can do best? What do I love the most?'" says Suh. His father had always discussed business with his six children; Suh, who had already married and had the first of his two daughters, hoped to do the same. (They are now 23 and 19.) Cosmetics, he realized, was a constant in his life—as it had been for his father. "Then everything became very clear," Suh says. He embarked on several strategies: selling off divisions that were not about beauty and health, expanding in China, and developing breakthrough products.

Since Amorepacific's founding, the company has never ceded its No. 1 domestic market position. (South Koreans are the world's third-biggest spenders on skin care, after residents of Japan and Hong Kong. Their per capita spending on skin care in 2014 was $99.40, compared with $64.40 in France and $43 in the U.S., according to Euromonitor International.) Suh credits that dominance, in part, to Amorepacific's tradition of creating new products. In 1966, it became the first company to use ginseng in facial cream and, in 1988, the first to use extract from green tea leaves, known for their high antioxidant levels, in moisturizer.

In 1997, the same year Suh formally took over the business as CEO, Amorepacific launched a new product, IOPE Retinol 2500, the first anti-aging facial cream in Korea. It had been an ambitious project, which took about four years of research and development. "That one innovative product turned around the company," he says.

Today, Amorepacific caters to consumers across all income levels and distribution channels. Its top global brands are Sulwhasoo, a luxury line based on ginseng and other medicinal herbs; Laneige, a premium brand with a whitening line that promotes translucent skin; Mamonde, flower-based products for the mass market; green tea–based Innisfree; and bubble-gum pink Etude House, an inexpensive makeup for teenagers.

The company's R&D center in Yongin, outside Seoul, bustles with researchers and chemists in white gowns. (Amorepacific spends about 3 percent of its revenue on research and development and has 500 researchers around the world.) Designed by Portuguese architect Álvaro Siza, the minimalistic building feels more like an art museum than a lab. The center is at the heart of Suh's ambition to transform the company into a global presence.

The firm's most successful recent innovation, introduced in 2008, is called Cushion. Developed by a researcher who was inspired by stamp pads, Cushion combines anti-aging moisturizer, sunblock, and foundation inside a portable compact with an applicator. It's become a runaway hit for providing the light, sheer coverage preferred by Korean women, as well as for its convenience. Last year, Amorepacific sold more than 26 million units—one every

BLOOMBERG TIPS

Tracking Amorepacific

You can use the Bloomberg Intelligence dashboard for household products to compare Amorepacific's financial performance with that of other makers of beauty products. Type **BI HHCPG <Go>** on the Bloomberg Professional service. Click on Comp Sheets under Monitor. Next, click on the Eq Val tab and then on the Latest Ratio subtab if it's not already selected. As of March 16, Amorepacific's estimated price-earnings ratio of 38.58 was well above global peer companies' average of 25.69. Click on the Op Stats tab and on the Latest Ratio subtab. The Korean company's year-over-year sales growth of 24.95 percent was second only to Revlon's 29.86 percent growth. JON ASMUNDSSON

1.2 seconds. L'Oréal's Lancôme was the first Western brand to follow suit, launching its own version, Lancôme Miracle Cushion, this February. Suh says one of his most immediate challenges is appealing to global customers with his Cushion products as competition intensifies.

Korea's emergence as a cultural trendsetter has also helped Suh. Since the late 1990s, the country's pop music and television dramas have taken off in Asia, lending cachet to everything from Samsung Galaxy phones to Lotte Chilsung soft drinks. The same goes for "K-beauty" and Amorepacific's products.

Sam Le Cornu, who manages about $3 billion in Asian equities at Macquarie Investment Management in Hong Kong, witnessed the phenomenon when he stayed at the Hotel Shilla in Seoul last September. Ten minutes before a duty-free shop opened, 18 tour buses stopped out front and offloaded some 900 mainland Chinese tourists—who later emerged with shopping bags filled with Korean cosmetics. Le Cornu, who had bought a "significant" number of shares in Amorepacific at the end of 2013, started adding more when he returned to Hong Kong. The price has gone up about 36 percent since then. "Amorepacific is one of the best companies in Korea, with incredibly strong management," he says.

The company's success in China—where larger rivals such as Shiseido and Procter & Gamble have seen their market shares decline since 2010—is one reason investors like what they see in Amorepacific. Having visited China more than 100 times, Suh says he's learned to see the country as five distinct regions—or even 15 clusters—rather than as a single entity. When Amorepacific entered China in 1992, for example, Suh's father made a strategic decision to bypass top-tier cities such as Shanghai and Beijing in favor of Shenyang, an industrial city in the northeast. The cold, dry winters there were harsh on skin, and after extensive research, Amorepacific developed a range of offerings to help the locals endure the area's extreme weather. That early lesson propelled Amorepacific to market different types of skin-care products according to seasons and regions. Just because something moves in a single store doesn't mean you "can sell it to a billion people," Suh says with a smile.

South Koreans spend more per capita on skin-care products than Americans or the French.

SEONGJOON CHO/BLOOMBERG

Asia's burgeoning middle class bodes well for business, Suh says, because disposable income and the number of women using makeup for the first time will increase "exponentially." Amorepacific, which had 2,335 stores in China as of February, plans to increase that number by 15 percent in 2015. By 2020, China will probably account for as much as 30 percent of total sales, he says.

If the trend continues, the company could become the No. 2 cosmetics brand, after L'Oréal, in China by 2016, according to Cara Song, a consumer products analyst at Nomura Securities in Seoul. (It's currently No. 5 based on market share, which includes duty-free products purchased by the Chinese in Korea.) Song says Chinese consumers have embraced Amorepacific products because they view them as being innovative, genuine, and providing value. "One question I get most from my clients is, 'How did a single company manage to do in China what most multinationals have struggled to accomplish?'" she says. Her answer: Korea is a hypercompetitive market where it's very hard to please trend-conscious consumers. "This has prepared Amorepacific to become a global force," she says.

Looking at the replica of his grandmother's kitchen, where Amorepacific began, Suh says that becoming one of the world's elite beauty brands is indeed his ambition. "Our goal is to turn my grandmother's kitchen into the global kitchen to create new beauty," he says.

'AMOREPACIFIC IS ONE OF THE BEST COMPANIES IN KOREA, WITH INCREDIBLY STRONG MANAGEMENT,'
SAYS SAM LE CORNU OF MACQUARIE INVESTMENT MANAGEMENT IN HONG KONG.

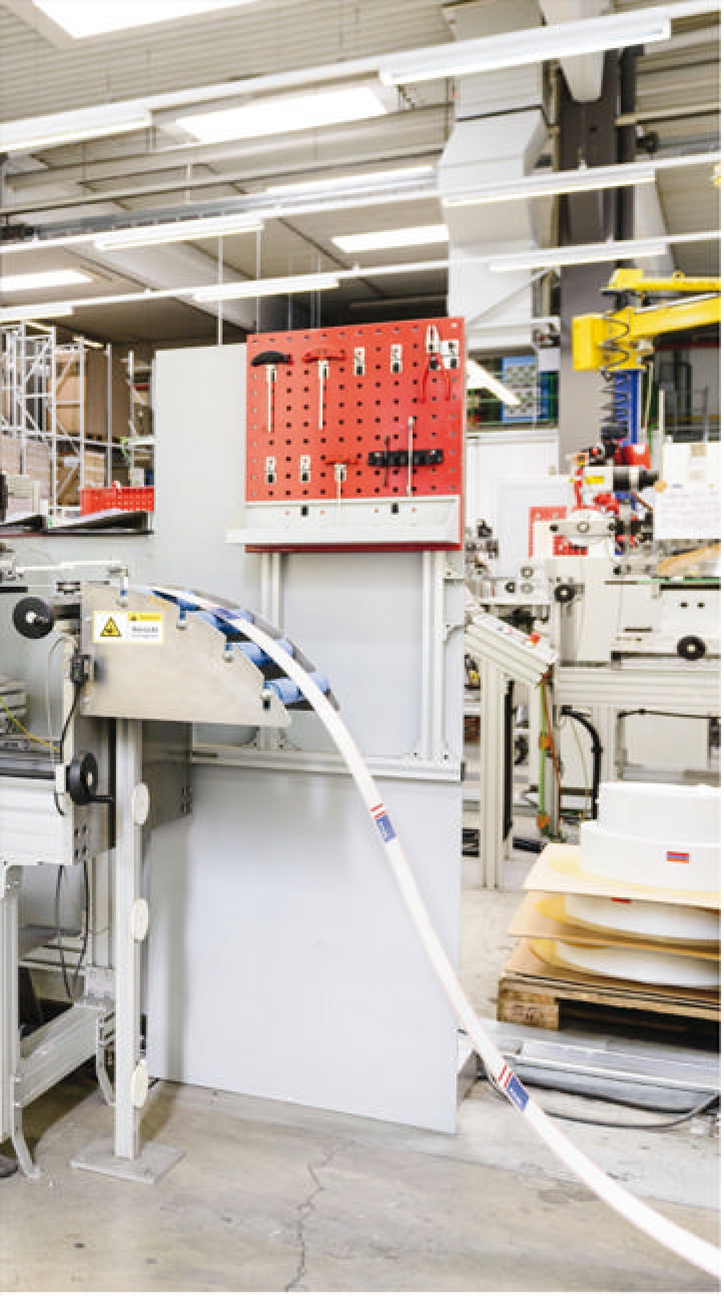
Yoolim Lee is a senior writer at *Bloomberg Markets* in Singapore. yoolim@bloomberg.net **Liza Lin** covers consumer products companies at Bloomberg News in Shanghai. llin15@bloomberg.net **Rose Kim** covers Korean companies in Seoul. rkim76@bloomberg.net With assistance from **Tom Metcalf** in London.

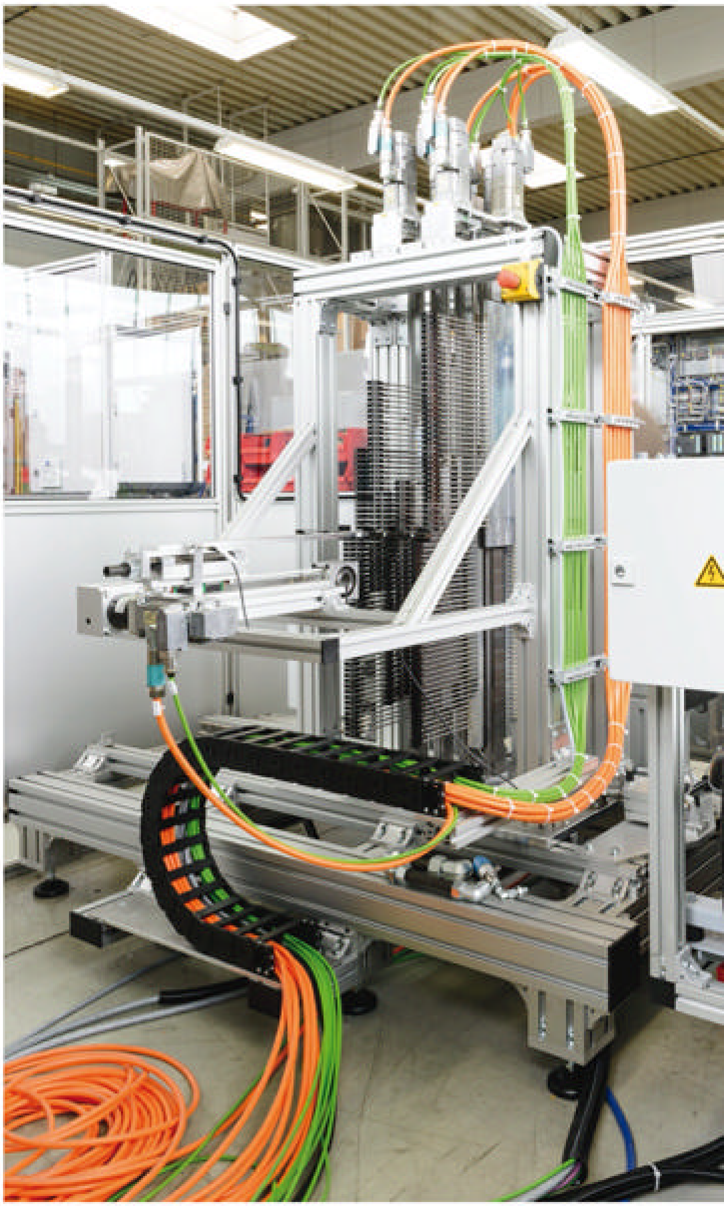
COUNTRY FOCUS

GERMANY'S EX

PHOTOGRAPHS BY **ALASTAIR PHILIP WIPER**

Utsch has built a €250 million business producing license plates and the machines that make them from its factory east of Bonn.





BY **ALEX WEBB**

PORT ENGINES

SMALL MANUFACTURERS WITH **NICHE PRODUCTS** ARE DRIVING EUROPE'S BIGGEST ECONOMY AS THE REGION STRUGGLES TO BOOST GROWTH.

ON THE EDGE OF THE SNOW-dusted pine forest surrounding Siegen, Germany, workers at the Erich Utsch AG plant are building a staple of American prisons: the equipment convicts use to crank out vehicle license plates. Three refrigerator-sized presses taking shape on this February morning will head to Nevada. "I always wanted to sell our machines internationally," says Manfred Utsch, the son of the company's founder. "Now, 80 percent of our revenue comes from abroad."

Utsch, with its niche product and exporting zeal, is one of the 3.7 million small and medium-sized companies driving Europe's biggest economy. Germany calls them the Mittelstand. They make everything from prosthetic limbs to church organs, typically bringing in annual revenue of less than €50 million ($53 million) apiece. Most are family owned, like Utsch.

Mittelstand companies wield broad clout despite their narrow, sometimes quirky, goods. They account for more than half of Germany's economic output and 63 percent of its employees. They contributed 19 percent of exports, government data from 2011 show. Last year, Germany claimed the world's largest current-account surplus; its record €215.3 billion trumped China's €176.7 billion. "Mittelstand companies are often better at innovation because they have a smaller but more efficient organization," says Andreas Scheuerle, an economist at DekaBank Deutsche Girozentrale in Frankfurt. "That's really important for Germany as an exporting nation."

Exports are key as Germany recovers from a slump that sapped growth throughout Europe last year. The nation's gross domestic product shrank 0.1 percent in the quarter that ended on June 30. Exporters suffered from sanctions Western nations imposed on Russia after it annexed the Crimea region of Ukraine in March. Now, growth is inching up. Germany's GDP climbed 0.7 percent in the three months through Dec. 31, topping the 0.3 percent average rise for euro-based economies. Germans went to work in 77,500 more manufacturing jobs than they had in 2013. Unemployment fell to 6.5 percent, the lowest since reunification in 1990, and almost half of the European Union's average of 11.4 percent.

Germany's Mittelstand may benefit further from the euro's decline. The currency dropped below $1.10 in March for the first time since September 2003 as European Central Bank President Mario Draghi announced the start of his plan to buy €1.1 trillion of debt. "The significant depreciation of the euro is boosting exports," says Ralph Solveen, head of economic research at Commerzbank in Frankfurt. "It would be an even bigger help if there was faster growth in developed countries."

European leaders note Germany's resilience. Although the U.K. is Europe's fastest-growing major economy, with GDP rising 2.7 percent last year, its trade deficit has ballooned by 30 percent since David Cameron was elected prime minister in 2010. Eager to create manufacturing jobs and cut the $145 billion gap—the biggest in the European Union—Cameron invoked

Manfred Utsch inherited his family's company in 1969. He still works part time from an office near the production line.

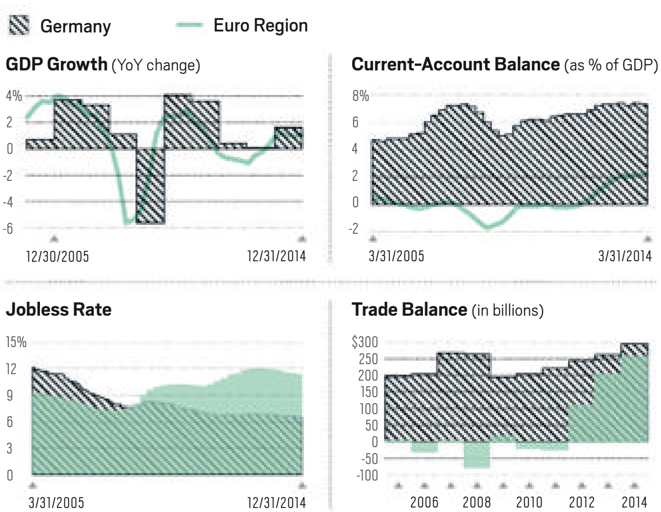
Germany on Feb. 10. "I want Britain to have its own version of the German Mittelstand—a backbone of medium-sized firms which export, innovate, generate new jobs," he told the British Chambers of Commerce.

Mittelstand companies were exporting as long ago as the 19th century, when today's Germany was a hodgepodge of independent principalities and duchies. A Munich brewery would effectively export its wheat beer to sell in Hamburg. The country promoted vocational training for brewers, clockmakers, and other craftspeople. The artisan-friendly philosophy carried into the 20th century as Germans built precision instruments and automobile parts. Since World War II, companies from sports-clothing maker Adidas to software provider SAP have graduated from the Mittelstand to become global giants.

Countries striving to duplicate Germany's

VITAL SIGNS

Germany stands out for its 6.5 percent unemployment, the lowest since the country's reunification, and the world's biggest current-account surplus.



Sources: Bloomberg, OECD

COURTESY OF UTSCH

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ABACO, BAHAMAS

Villa Tatutina. Marsh Harbour. 1.25 acres and beautifully landscaped. Harbourfront location. 6 BR in 3 buildings. Staff apt. Pool, protected deepwater docks. WEB: 22603. **$6,000,000 US.** George.Damianos@SothebysRealty.com

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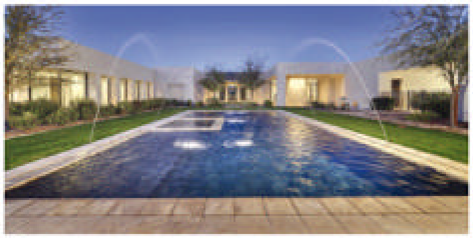


PARADISE VALLEY, AZ

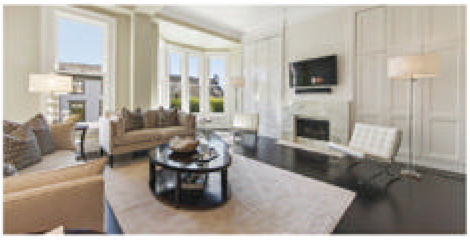
Artfully Contemporary; exquisite interiors, superb craftsmanship, and block constructed walls to include a detached guest home. This 2.5 acre flat lot is elevated high enough to capture city lights, and 360 degree mountain views. **$7,495,000.** Frank Aazami.

Russ Lyon Sotheby's International Realty
+1 480.266.0240 | ArtfullyContemporary.com

ROSS, CA

Distinguished gated compound on 2± acres with a circular drive, lawns, gardens, outdoor kitchen, pool and spa. 6 BR, 7.5 bath main house, separate 2-story guest quarters, 1 BR apartment and studio. **$10,750,000.** Bill Bullock and Lydia Sarkissian.

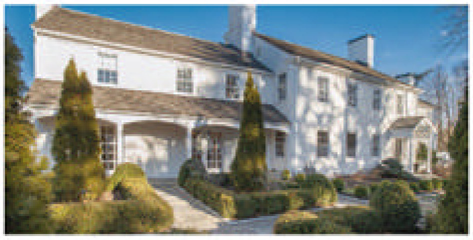
Decker Bullock Sotheby's International Realty
+1 415.517.7720 | globalestates.com



SAN FRANCISCO, CA

This exquisitely renovated, forest-view Victorian consists of 5 BR, 3.5 baths, formal living and dining rooms, marble kitchen, family/media room, sublime master suite, decks, and 2-car parking. **$6,495,000.** Janet Feinberg Schindler.

Sotheby's International Realty San Francisco Brokerage
+1 415.296.2211 | PresidioWallHome.com



NEW CANAAN, CT

Country estate with 5 BR, 2 BR guest house, finished barn, pool, spa, stunning gardens and vistas. Completely renovated: new gourmet kitchens, baths, roof, systems and garages. **$3,650,000.** 589OenokeRidge.com. Christine Williams and Rita Kirby.

William Pitt Sotheby's International Realty
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KEY LARGO, FL

Ocean Reef home with island-style floor plan, center courtyard, blue-tiled pool and waterfall spa, and panoramic canal front views with dockage. Features include 4 BR, great room, dining area, 2 fireplaces, and a spacious family room. **$5,495,000.**

Russell Post Sotheby's International Realty
+1 305.367.3131 | RussellPostSIR.com

KEY LARGO, FL

Elegant waterfront home in the private community of Ocean Reef offering 3 BR suites, media room/den, formal dining room, gourmet kitchen, spacious pool patio with cascading spa and dockage. **$5,290,000.** Russell.Post@sothebysrealty.com

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+1 305.367.2027 | RussellPostSIR.com

NAPLES/MARCO ISLAND, FL

Frank Lloyd Wright inspired contemporary home with pool and spa, offering complete privacy in a luxury gated beachfront island community with tennis, golf, croquet, fitness, clubhouse and dining. **$4,725,000.** Michelle Thomas.

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NAPLES/MARCO ISLAND, FL

Spectacular waterfront home with amazing bay views and walking distance to the beach. Superior construction, elevator, expansive windows, pool, spa, outdoor kitchen, large dock with boat lift and jet ski lifts. **$3,085,000.** Michelle Thomas.

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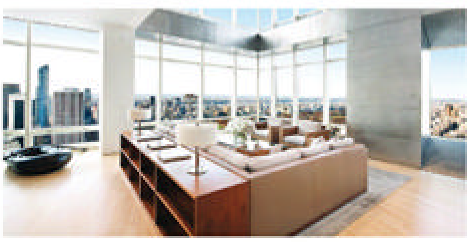

NEW YORK, NY

Perched atop the iconic One Beacon Court, this glamorous 9,000± sf duplex features phenomenal views and abundant sunlight from every room. **$82,000,000.** Serena Boardman.

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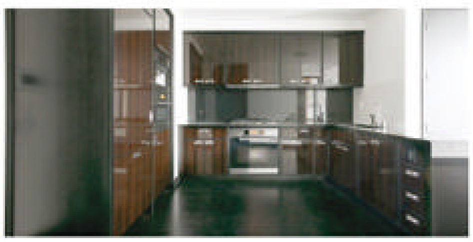

NEW YORK, NY

ONE57, Manhattan's newest, iconic residential tower, has arrived! Be the first to experience living in this sprawling 1 BR, 1.5 bath home. **$4,950,000.** Kevin B. Brown.

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KIAWAH ISLAND, SC

Discover Indigo Park. Kiawah Island's exciting new eco-friendly development. Indigo Park consists of 16 LEED certified homes with fabulous marsh views. 2 to 5 BR plans available. Prices upon request. H. Middleton Rutledge.

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+1 843.723.7150 | DanielRavenelSIR.com

TYPE SIRA <GO>

success need to mimic its apprenticeship programs, says Hermann Simon, a management consultant who identified a subset of the Mittelstand that he calls "hidden champions." Like Utsch, these firms are among the top three globally in the share of their markets and typically have annual revenue of about €325 million. "The most important task is to make sure you have highly qualified workers," Simon says.

Manfred Utsch, 79, still keeps an eye on employees. He works part time from a fourth-floor office a five-minute walk from Utsch's production line. Manfred joined the company full-time in 1965, quitting his shoe salesman job four years after his father founded Utsch. His first test: building 20 machines to meet customer demand. The company had started its license-plate-making business by repurposing wine presses from local vintners and hadn't contemplated such volume. "I had no idea how we were going to do it," he says. Tool-crafting friends chipped in, setting Utsch on its machinery-making path. "Now, we have 20,000 presses worldwide," he says.

'The most important task is to make sure you have highly qualified workers,' says Hermann Simon, who coined the term 'hidden champions.'

Manfred inherited the company in 1969 and owns 82 percent of the shares. The rest is also privately held, divided between former executives and Manfred's three children. Along with its machines, the company produces about 20 million license plates a year. Manfred points to one with blue shields flanked by two leopards. "Who are we making these for?" he asks. "Somalia," a line worker answers.

Economists and managers see cracks that could erode the Mittelstand's dominance. Top university graduates often don't want to work in places such as Siegen, about 110 kilometers (68 miles) east of Bonn. A potential change in tax law might derail the benefit of family ownership. In December, the constitutional court in Karlsruhe told the government to revise legislation that lets family-owned businesses pass between generations with little or no tax bill. This helps Mittelstand companies plan for the long term, says Michael Holz, a researcher at the Institute for Mittelstand Research in Bonn. About 20 percent of firms say ending the privilege would threaten their continued operations, according to the BVMW Mittelstand association. "It's a serious issue," says Simon. "If you have a high inheritance tax, you either pay it and are then void of capital to pay for innovation, or you have to sell the company."

Manfred Utsch, whose company has customers from Dubai to Norway and generates about €250 million in annual sales, may create a foundation to house his stake. That would remove direct control from his offspring and eliminate many tax issues. "For now, as far as I'm concerned, I'm still here," he says.

And he's still proud of his exports. Utsch just finished 2 million plates for Egypt. "Now, we can get millions of euros from one order," he says.

Alex Webb covers German industrial companies at Bloomberg News in Munich. awebb25@bloomberg.net

BLOOMBERG TIPS

Tracking German Exports

You can use the Trade Flow (ECTR) function to track a selected country's imports and exports. Type **ECTR <Go>** on the Bloomberg Professional service. Tab in to the field in the upper-left corner of the screen, enter *GERMANY*, and click on the country in the list of matches. Next, click on the arrow to the right of Order By and select Exports. Choose Yearly as the periodicity if it's not already selected. Click on the arrow to the right of 2013 and select 2000 to choose that starting point. To see how Germany's trade has evolved since 2000, click repeatedly on the >> button. Exports to China, for example, increased during the period. JON ASMUNDSSON

STRENGTH IN NUMBERS

Germany leads the world in little-known companies that command big shares of their markets.

Mittelstand companies include those with revenue of less than €50 million as well as some larger and family-owned firms.

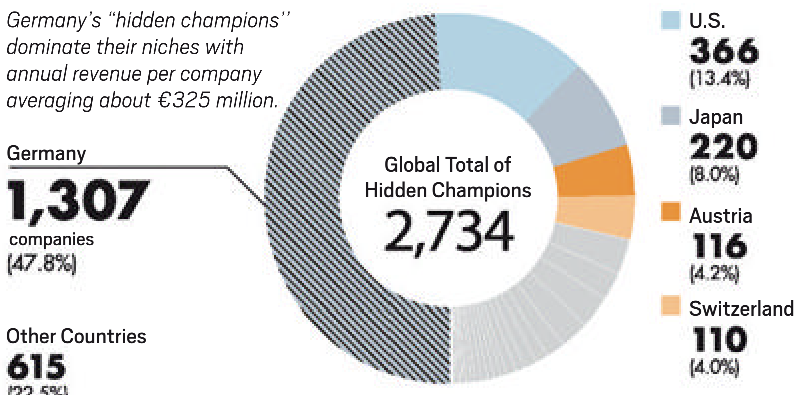
52% of Germany's economic output

19% of total German exports

37% of German revenue

63% of German workforce

Germany's "hidden champions" dominate their niches with annual revenue per company averaging about €325 million.



Sources: Bloomberg, Federal Ministry of Economics and Technology, Simon-Kucher & Partners

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STRATEGIES

PROFILE

Making Dividends Pay Off

Leonard Tannenbaum's Fifth Street Asset Management oversees $6 billion in a profusion of credit vehicles, including two listed funds that pay out 10 percent or more a year.

BY JON ASMUNDSSON

WHEN LEONARD TANNENBAUM set up shop in the basement of an office building in Mount Kisco, New York, his plan for his one-man investing business was about as basic as you can get. "Early on, the idea was to make money," Tannenbaum says. "How do I make money? How do I get an edge?"

It was 1998, and he was 27 years old, a Wharton MBA with two years as an analyst at Merrill Lynch and a couple of stints at fund firms. He even sublet out half of the 800-square-foot (74-square-meter) space. Tannenbaum asked himself: "Is there a better mousetrap to develop?"

The mousetrap Tannenbaum built almost made him a billionaire last year. When the initial public offering of Fifth Street Asset Management was being marketed at $24 to $26 a share, Tannenbaum's stake in the company would have been worth more than $1 billion at the upper end of the initial range.

Amid market turbulence in October, though, the stock sale was pulled. Refiled, the offering priced at $17, and shares began trading on Oct. 30. "We got two-thirds of the way there," Tannenbaum, 43, says. On March 16, the stock traded at $11.88, making his 40.2 million Class B shares worth $478 million.

Now headquartered in a 120,000-square-foot, light-filled building in Greenwich, Connecticut, Fifth Street manages more than $6 billion altogether. Its vehicles include a $70 million long-short credit hedge fund, a private senior loan fund, and a $309 million collateralized loan obligation. Most of the firm's assets, though, are in two publicly traded business development companies: Fifth Street Finance Corp. and Fifth Street Senior Floating Rate Corp.

FOR RETAIL INVESTORS, the appeal of business development companies is simple: income. The average dividend yield of the 43 BDCs in the Wells Fargo Business Development Company Index was 9.1 percent as of March 16, according to data compiled by Bloomberg. By contrast, the average dividend yield of the 42 U.S. high-yield exchange-traded funds was 4.6 percent.

BDCs are essentially closed-end funds that finance private companies. They sell

LEONARD TANNENBAUM

CHAIRMAN AND CEO, FIFTH STREET ASSET MANAGEMENT

- Invests alongside **private equity sponsors**.
- Originates loans to **middle-market companies**.
- Started a **long-short credit** hedge fund.

Leonard Tannenbaum, in his office in Greenwich, Connecticut, says he's traded other BDCs in his firm's hedge fund.

PHOTOGRAPH BY **DUSTIN AKSLAND**

stock, borrow from banks to lever up, and use the resulting pot of money to invest in middle-market companies, mostly by originating loans but also via equity stakes. Like real estate investment trusts, BDCs avoid corporate taxes by passing at least 90 percent of their net income through to investors.

INVESTING ALONGSIDE PRIVATE EQUITY FIRMS PROVIDES AN EDGE, TANNENBAUM SAYS.

Fifth Street Asset Management's larger BDC is $2.9 billion-in-assets Fifth Street Finance Corp., whose ticker is FSC. As of March 16, it traded at a dividend yield of 10.4 percent.

That level of yield remained after a big cut in FSC's dividend and a plunge in its stock price. In February, FSC declared that it would pay a 6 cent dividend each month through August, down from 9.17 cents. The reduction reflected slower-than-expected growth in net investment income, Todd Owens, FSC's CEO, said on the fund's Feb. 9 earnings call. After FSC reduced its payout to an annual rate of 72 cents from $1.10, the stock dropped 15 percent to trade at $7.22. "Notice what it did," Tannenbaum says. "It traded right to a 10 percent yield."

BDCs are regulated under the Investment Company Act of 1940, which was amended by a 1980 law that created them. The act sets a number of requirements for BDCs. For one, 70 percent of their holdings must be "qualifying assets": securities of private U.S. companies, for example. For another, BDCs' portfolios must be diversified in specified ways.

Each quarter in regulatory filings, BDCs list their investments, marked to fair value. As of Dec. 31, FSC held investments in 137 companies. Among them was a piece of a $195 million one-stop financing facility for BeyondTrust,a Phoenix-based cybersecurity firm. FSC's $65.2 million piece of the first-lien term loan paid a floating rate of the London interbank offered rate plus 7 percent, with a 1 percent Libor floor. FSC originated the loan in conjunction with BeyondTrust's September acquisition by Veritas Capital, a New York–based private equity firm.

TANNENBAUM SAYS HE realized early on that he could get an edge by investing alongside private equity firms because they essentially provide a credit enhancement. To raise a new fund, sponsors typically want to avoid a big loss in the previous vehicle. "So there's a willingness and ability of a private equity firm to re-up at a problem," he says.

Tannenbaum says that the complexity and sheer number of investments make it unlikely that busy Wall Street analysts—let alone retail investors—can analyze all of a BDC's holdings. That provides another opportunity for an edge, he says. "Knowing your industry, knowing your assets, knowing what's going on in the middle market—you can take advantage of that," he says.

TIP BOX

Type **PE <Go>** for the Private Equity Overview function.

That's what Tannenbaum did recently in the firm's hedge fund, he says. Started two years ago, Fifth Street Opportunities Fund gained 11.3 percent in 2013 and 9.6 percent in 2014, according to a fund letter obtained by Bloomberg.

When FSC wrote down an investment to 40 percent of face value in February, Tannenbaum knew that a couple of other BDCs had pieces of the same loan still carried at higher values, he says. "So there's your edge: In the hedge fund, I can trade those things knowing how retail is going to respond to them," Tannenbaum says. "We took advantage of it by shorting some of our competitors."

Jon Asmundsson is Strategies editor of *Bloomberg Markets*.
jasmundsson@bloomberg.net

FINDING BDCs

You can use the Bloomberg Industry Classification (BICS) function to find business development companies. Type **BICS <Go>** on the Bloomberg Professional service. Tab in to the SEARCH FOR AN INDUSTRY field, enter *BDCS*, and click on the matching item in the list. A list of BDCs is displayed on the right side of the screen. FSC was the fifth largest by market capitalization as of March 16. Right click on Fifth Street Finance and select Relative Valuation (RV) to compare the fund with its peers. JON ASMUNDSSON

Corporate Risk

MARS <Go>
lets you aggregate positions and risk exposures and mark to market and stress test multiasset portfolios.

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enables you to view Bloomberg Valuation pricing for various types of securities.

CCRV <Go>
charts commodity forwards and futures curves.

CFVL <Go>
displays Bloomberg commodity fair value curves for real-time forward market-price indications.

CRPR <Go>
lets you view credit ratings for a selected issuer.

DRAM <Go>
enables you to use Bloomberg's model-generated estimates of default risk to screen a list of companies.

HWIZ <Go>
lets you compare currency-hedging strategies.

CRV <Go>
lets you construct custom fixed-income curves.

CVA <Go>
displays information on computing credit valuation adjustments.

DDIS <Go>
displays the maturity distribution for a selected debt issuer.

DRSK <Go>
lets you analyze the creditworthiness of an issuer with Bloomberg's model-generated estimates of default risk.

FICM <Go>
tracks trading in corporate bond markets.

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prices foreign-exchange options.

↑ **NIA <Go>**
lets you compare the pricing of new corporate bonds with bonds sold in the secondary markets.

FXGO <Go>
lets you access information about Bloomberg's FX electronic-trading platform.

FRD <Go>
lets you monitor and price currency forwards.

LOAN <Go>
lets you monitor and analyze trends in the syndicated loan market.

GC <Go>
enables you to graph fixed-income curves in real time.

HEFF <Go>
enables you to perform a hedge effectiveness test on a derivative.

FXFC <Go>
displays FX forecasts.

NIM <Go>
enables you to monitor new-issue bonds.

SDR <Go>
aggregates options trade data.

XCCY <Go>
lets you analyze cross-currency basis-swap spreads.

FIW <Go>
enables you to analyze lists of bonds.

SWPM <Go>
lets you price interest-rate swaps.

WCDS <Go>
monitors credit-default swaps.

Compiled by
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jasmundsson@bloomberg.net

PULL OUT AND SAVE. // **PRESS <HELP> TWICE** TO SEND A QUESTION TO THE BLOOMBERG ANALYTICS HELP DESK.

TEAR OUT AND SAVE


WHAT GOOD IS AN INVESTMENT THAT HITS THE MARK IF IT'S THE WRONG MARK?
THE CITY HERALD
MDY
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How to Upload and Use Your Proprietary Data

BY LEE O'DWYER, CFA

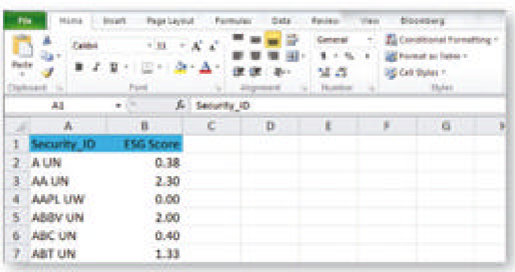
WHEN YOU ANALYZE securities, you may create proprietary earnings estimates, price targets, quant scores, or other data series. Tapping that data in charts and security screenings and via the portfolio and risk analysis tools on the Bloomberg Professional service can help you make better investing decisions—and drive your performance.

Here's a guide to the simple methods you can use to upload your proprietary data so that you and other people at your firm can use it in your work.

First, let's get some sample quantitative data, using a hypothetical proprietary data set that contains ESG scores for companies in the Standard & Poor's 500 Index. To download a copy of this sample data set, type **DOCS #2073003 <Go>** and click on the XLSX link.

On the first sheet of the Excel spreadsheet, column A contains a list of tickers for the S&P 500 stocks. Column B shows the hypothetical ESG score data for the companies. ESG—environmental, social, and governance—data is extra-financial information about companies that can affect their reputations and performance. An ESG score might be based on a company's annual greenhouse gas emissions or on its percentage of women in management.

Type **BBU <Go>** for the Bloomberg Uploader, which enables you to upload custom data.



Use your own custom data, or type **DOCS #2073003 <Go>** to download a sample file.

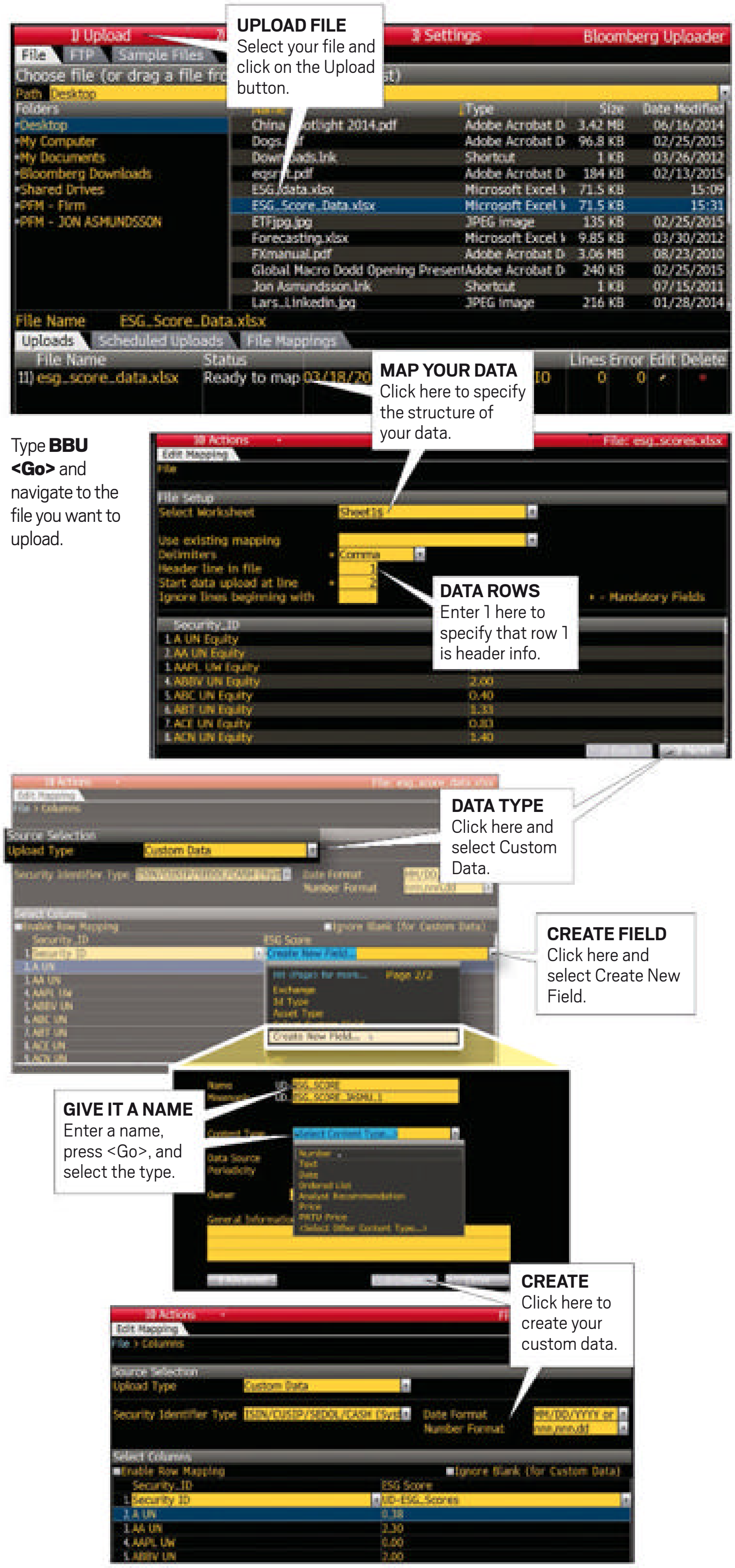
Give the sample spreadsheet a name and save it to a location where you'll be able to find it again—your desktop, for example.

NEXT, LET'S IMPORT the data into the Bloomberg Professional service. To do that, type **BBU <Go>** for the Bloomberg Uploader function. BBU is integrated with the Custom Data Editor (CDE) function, which enables you to view and maintain data on your terminal. The File tab in BBU displays a file browser that lets you navigate to the file you want to upload. Click on Desktop, for example, and then select your file from the list that appears on the right side of the screen. Click on the Upload button on the red tool bar.

The file will appear at the bottom of the screen under the Uploads tab. After the file has been

TIP BOX

Type **CDE <Go>** to maintain and update your custom data.



processed, Ready To Map will appear in the Status. Click on Ready To Map.

The mapping tool in the screen that appears lets you specify where the data begins. In our sample spreadsheet, the column headers were in row 1 and the data started in row 2. Tab in to the HEADER LINE IN FILE field to the right of Header Line in File, and enter *1*. Enter *2* in the START DATA UPLOAD AT LINE field and press <Go>. Click on the Next button at the bottom of the screen.

We want to specify that this is a set of custom data. To do that, click on the arrow to the right of Upload Type and select Custom Data. Next, let's use the drop-down menus at the bottom of the screen to describe our data and create a new custom data item. Under the Security_ID column header, click on the arrow to the right of Skip Column and select Security ID.

UNDER ESG SCORE, click on the arrow to the right of Skip Column, press <Page Fwd>, and select Create New Field.

Enter a name, such as *ESG SCORE*, in the NAME field, and press <Go>. Bloomberg will assign a mnemonic that you can use later to access the data. The next step is important: You'll specify what type of data you've uploaded. In this case, we're importing a number. Click on the arrow to the right of Content Type and select <Select Other Content Type>. Click on the plus sign to the left of Basic to expand the list and then click on Number. Click on the Create button.

Click on Next and then on Finish, and the mapping will run. You've just uploaded the 502 tickers, with an assigned custom data field for each security. In addition, if your data had included dates, then a time series would be available.

You can now use your custom data in Bloomberg functions. Type **A US <Equity> GP <Go>** to graph shares of Agilent Technologies, a Santa Clara, California–based maker of biological- and chemical-testing tools that's a member of the S&P 500. To add your custom data to the chart, click on Security/Study in the upper-right corner of the screen and then on Add Field, enter *UD*, and click on the UD-ESG Score Custom Data Field in the list of matches. A dot representing the ESG score appears on the chart. (In this case, a time series would make for a livelier chart, no doubt.)

You can also use the data with the Equity Screening (EQS) function. Type **EQS <Go>**. To screen for S&P 500 companies whose ESG score is 3.5 or higher, first enter *SPX* in the field and click on the index. Next, enter *UD* in the field and click on the UD-ESG SCORE item. Select >= Greater Than Or Equal To in the menu. Enter *3.5* in the field that appears and press <Go>. That trimmed the list to 22 companies. To see the list, click on the Results button. In addition, you can use those scores in formulas or ranking models you've created for screens. To save the search so you can use it later in a portfolio optimization, click on Actions and select Save As. Enter a name and click on Update.

Perhaps the most powerful application for custom data is the Portfolio & Risk Analytics (PORT) function. PORT enables you to describe a portfolio with custom scores, run attribution on custom classifications, and incorporate your data into an optimization task.

Type **SPY US <Equity> PORT <Go>** to analyze the SPDR S&P 500 ETF Trust, for example. Click on the Settings button on the red tool bar and select Portfolio Look-through if it isn't already selected. Click on the Characteristics tab and then on the Main View subtab. Click on the arrow to the right of By, select Asset Type, and press <Go>. Click on the plus sign to the left of Equity for a list of stocks held by the ETF, which tracks the S&P 500 index.

YOU CAN ADD a column that displays your custom data. Right click on a column header and select Add/Remove Fields. In the Edit Template window that appears, enter *UD* in the field under Available Fields and press <Go>. Click on the UD-ESG SCORE item under My Custom Data to select it. Then click on the blue plus sign to add it to the list of Selected Fields. You can drag and drop items to change the order. You can also click on the pencil icon to change a calculation methodology. For instance, depending on its properties, a custom score might be better expressed as an average than as a weighted average. Click on Update.

Finally, to use your custom data in portfolio optimization, click on Trade Simulation and select Launch Optimizer. The optimizer lets you set a goal, determine the universe of securities you want to trade from or hold, place constraints on the portfolio, and specify security properties. You can use custom data in a variety of ways in an optimization. For example, you can set a goal of maximizing the ESG score of your portfolio. To do that, click on the Add Goal button. Enter *UD* in the SEARCH field and press <Go>. Scroll down in the list and click on UD-ESG Score and then on the Select button.

You could also use the data to create a trade universe based on the EQS search you did for companies with a score of 3.5 or higher. Click on Add Universe and select Trade List under Rule, if it isn't already selected. Under Source, select Equity Screen (EQS). And under Security List, select the name of your saved search. Type <Go> 1 <Go> to run the optimization.

Once you've created a custom data series, you can use it with functions such as Portfolio & Risk Analytics. Type **PORT <Go>**.

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TIP BOX

Type **PRTU <Go>** for the Portfolio Administration function.


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Digging Into Muni Opportunities

BY MIKE ALAGNA

INVESTORS FROM AROUND the world can find opportunities in U.S. municipal bonds.

Long dominated by local individual investors, the market has attracted nontraditional buyers in recent years. In particular, the taxable Build America Bonds program, which was created in 2009 and expired in 2010, lured buyers from China and other countries.

Why would overseas investors buy U.S. munis? For one thing, municipal bonds can offer nice yields—especially when compared with the near-record-low interest rates available in much of the world.

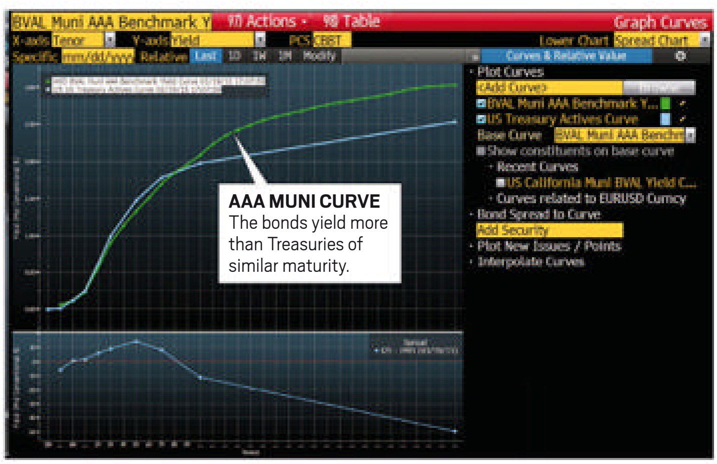
What's more, the market can generate impressive overall gains. Munis had a total return of 9.8 percent in 2014, according to data from Bank of America Merrill Lynch. To display monthly, quarterly, and annual return data for the BofA Merrill Lynch US Municipal Securities Index, type **IND15 UOAO <Go>**.

Before the financial crisis, many municipal bonds yielded less than Treasuries of similar maturity, thanks to the value of their tax exemption to U.S. investors. Now, by contrast, many munis actually yield more than U.S. government bonds. To compare the yield curve of AAA-rated municipal bonds to that of Treasuries, type **GC I493 I25 <Go>** for the Graph Curves function.

TO STEP BACK and take a wider view, you can look at the $3.65 trillion muni bond market as the underpinning of the global economy. The U.S. is still the largest economy in the world: Its gross domestic product was $17.7 trillion in 2014. That was about 70 percent larger than the GDP of China and more than that of the entire euro zone. California alone has the eighth-largest economy in the world.

Making an economy hum requires many ingredients, but none is more important than infrastructure. Roads, bridges, tunnels, ports, railways, and electric grids are the circulatory system of an economy, enabling raw materials to move to factories, finished products to get to retail stores, people to travel to work, and power to be distributed to where it's needed.

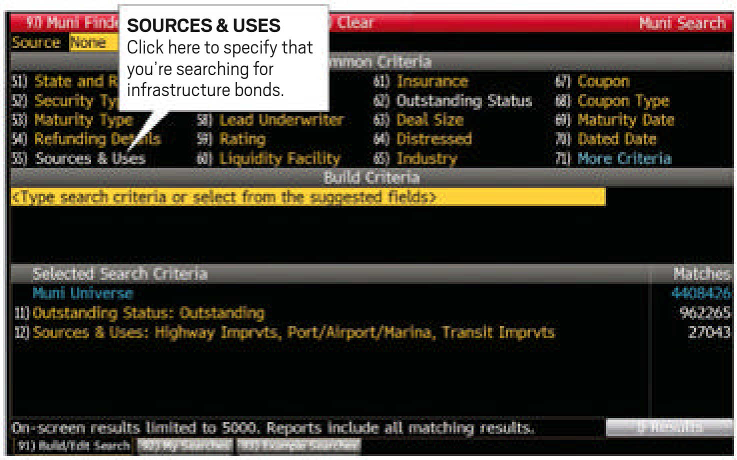
Given the importance of infrastructure, the U.S. is going to need a lot of investment in coming years. U.S. Treasury Secretary Jacob Lew, speaking at the Treasury and Transportation departments' Infrastructure Investment Summit in September, said the U.S. faces a $1 trillion gap in funding infrastructure needs through 2020. To support that view, Lew cited some statistics. "One out of nine bridges in the U.S. is structurally deficient," Lew



Type **GC I493 I25 <Go>** to graph municipal bond and Treasury yield curves.

TIP BOX

Type **FA <Go>** for a selected bond to view financial data for its issuer.



Type **MSRC <Go>** for the Muni Bond Search function.

said. "Roughly two-thirds of our roads are in less than good condition. And many of our ports are not deep enough to receive the next generation of supertankers."

The American Society of Civil Engineers was dire in its 2013 infrastructure report card: It gave U.S. infrastructure a D+ grade overall. The report found that costs from deficient infrastructure will reach $1.2 trillion for businesses and $611 billion for households by 2020 under current investment trends. The Reston, Virginia–based organization estimated that the U.S. needed a total of $3.6 trillion of infrastructure investment by 2020.

WHILE THE U.S. federal government provides about one-quarter of the funding for surface infrastructure projects through the Highway Trust Fund, the remainder comes from state and local governments. Most of that spending is paid for via municipal bonds.

You can use the Muni Bond Search (MSRC) function to find municipal bonds issued specifically to make improvements to highways, ports, airports, and marinas and for transit projects. Type **MSRC <Go>** and click on Sources & Uses under Common Criteria at the top of the screen. Click on the plus sign to the left of Transit to expand the list. Then click on Highway Imprvts, for example, to find bonds issued to fund such projects. Click on Update and then on Results for a list of the securities.

From 1949 to 2014, issuance of municipal debt for infrastructure totaled $900 billion, according to data compiled by Bloomberg. Muni issuance for that purpose peaked in 2010. That was the last year of the Build America Bonds program, which provided federal subsidies to municipalities on interest costs for issuing taxable bonds to fund infrastructure work.

Now, after years of declining investment because of strained budgets and austerity measures, municipal issuance for infrastructure spending is likely to resurge.

To dig into municipal issuers, you can use the Municipal Issuer Search (SMUN) function. Type **SMUN <Go>**. Bloomberg provides coverage on more than 46,000 issuers nationwide. Click on the arrow to the right of Sectors and select RB Revenue Bond. Next, click on the arrow to the right of Types and select Transportation. By default, the table ranks issuers by revenue.

Type **SMUN <Go>** for the Municipal Issuer Search function, which lets you dig into some 46,000 issuers.

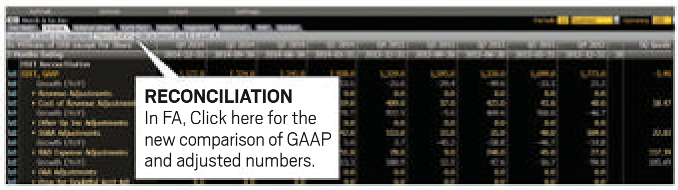
To analyze the finances of the New York State Thruway Authority, for example, scroll down the list to its name and click on it and then on Income Statement (FA IS) in the menu of related functions.

Public infrastructure is vital to business. Municipal bonds are thus a crucial part of keeping the world's largest economy growing.

Mike Alagna is on the staff of the Global Data department at Bloomberg in Princeton. malagna@bloomberg.net

Q: How can I see the effects of one-time items on a company's results?

A: Bloomberg recently released enhanced fundamental data for 4,300 U.S. and Canadian companies. The new data include more-granular detail on the companies' financial statements and new adjustments to remove the effects of one-off items such as merger expenses or the disposal of assets. A new reconciliation statement highlights the differences between generally accepted accounting principles and adjusted data. Coverage includes all current and former members of the Russell 3000 Index going back to 2009. To compare the GAAP and adjusted income statements of Kenilworth, New Jersey–based drugmaker Merck & Co., for example, type **MRK US <Equity> FA <Go>** on the Bloomberg Professional service for the Financial Analysis function. For the income statement, click on the I/S tab and then on the Reconciliation subtab. Scroll down to the Pretax Income Reconciliation section. To see details of calculations and gain access to the source documents, click on a figure such as the Q4 2014 Sale of Business item.



USE THE ENHANCED DATA IN A VARIETY OF TOOLS

GF <Go> allows you to graph and compare GAAP and adjusted data.
EQS <Go> lets you screen for stocks using adjusted fundamental data.
RV <Go> lets you use the new data items to compare relative value.
XLTP XDCF <Go> values a stock using a discounted cash flow model.

TRACKING THE ECB'S QE PROGRAM

ECB QE Buying Program is a new function that gives you insight into which bonds the European Central Bank might buy. Type **ECBB <Go>** and click on the Program Overview tab if it isn't already selected. The screen shows the estimated amount of euro-zone member-country bonds that will be purchased. Click on the Country Buying Analysis tab to analyze eligible bond issues by a selected country. The bonds with the highest Z-scores will be cheapest and might be purchased first by the ECB. (Z-score is a statistical measure of how closely a random value is to its mean.)

LATIN AMERICA NEWSLETTER

Latin America is a new biweekly Bloomberg Brief newsletter that covers local and cross-border Latin American markets. To subscribe, type **BRIEF LATAM <Go>** and click on the box to the left of Subscribe.

REGULATORY AND TAX INFO FOR BONDS

The Description and Issuer Description functions have been enhanced to display regulatory and tax information for all government bonds, corporates, and preferreds. Type **EJ1030695 <Corp> DES <Go>** for a bond issued by Siena, Italy–based Banca Monte dei Paschi di Siena. Type 2 <Go> and click on the Reg/Tax subtab.

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TIP BOX For more recent enhancements, type **NEW <Go>**.

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